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Vol. 12. No. 6. pp. 327-364. June, 1942

THE VETERINARY BULLETIN

1942

IMPERIAL MYCOLOGICAL INSTITUTE
30 MAY 1942

IMPERIAL BUREAU OF ANIMAL HEALTH
WEYBRIDGE, SURREY
ENGLAND

Price 5/- net

Annual Subscription £2

Imperial Agricultural Bureaux.

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Zwemer, R. L. See Kinsell, L. W., et al., jt. authors, 342.
Zwicky, H., 346.

NOTE:—In certain cases it is not possible to check references in the original publication. Such references are marked with an asterisk.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin.*

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin.*

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin.* Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin.*

Review on "Antibacterial Agents derived from Micro-Organisms"

Reprints of this review may be obtained from: Central Sales Branch (Imperial Agricultural Bureaux), Agricultural Research Building, Penglais, Aberystwyth. Price 1/- each.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 12.] June, 1942. [No. 6.

DISEASES CAUSED BY BACTERIA AND FUNGI

KLECKNER, A. L. (1941). **Efficiency of the Microscopic Examination of Incubated Milk Samples for the Detection of Mastitis Streptococci.**—*Amer. J. vet. Res.* **2.** 313–316.

K. has compared the method originally described by BREED & BAKER (1920), with the direct plating of a 1 : 100 dilution of the milk in blood agar.

In quarter samples free of mastitis streptococci the microscopic test gave 2·9% of false positives, caused by the presence of saprophytic streptococci. With known infected quarter samples the blood agar method did not reveal 11·3% of the infections, *i.e.* it was 87% efficient as compared with approximately 100% efficiency of the microscopic examination.

In the examination of 464 mixed quarter samples the microscopic method was 100% effective.—D. L. H.

I. LITTLE, R. B. (1941). **Simplified Cultural Methods for the Diagnosis of Streptococcic Mastitis.**—*Ass. Bull., internat. Ass. Milk Dlrs.* **33.** 565–570.

II. HARDENBERGH, J. G. (1941). **Discussion of Dr. Little's Paper.**—*Ibid.* 570.

I. A report is given of satisfactory results following the use of bromcresol purple, modified by the addition of an equal amount of sodium azide (1 : 500), in testing for mastitis due to *Streptococcus agalactiae*. For the more critical cultural tests, Edwards' selective liquid medium is recommended. This medium has a further advantage, *viz*, that after inoculation, extracts can be prepared from it for the serological identification of other milk streptococci.

II. In a group of tests with 200 cows the modified bromcresol purple test plus microscopic examination of milk films from incubated bromcresol purple tubes gave satisfactory and consistent results over a period, and the identification of *Str. agalactiae* mastitis was greatly facilitated.—D. D. OGILVIE.

POUNDEN, W. D., & JOHNSON, M. M. (1941). **The Influence of an Udder Coccus upon the Activity of Mastitis Streptococci in Milk.**—*Amer. J. vet. Res.* **2.** 317–318.

The authors draw attention to an udder coccus which favours the activity of *Str. agalactiae* in milk samples. This coccus, which resembles *Staphylococcus albus*, is capable of stimulating the growth of *Str. agalactiae*, the growth of which was assessed by the titratable acidity in Hotis tests.—D. L. HUGHES.

OGAWA, M., & KOBAYASHI, R. (1941). **Comparative Studies of the Classifications of Hemolytic Streptococci by Lancefield and by Kobayashi.**—*Kitasato Arch. exp. Med.* **18.** 64–89. [In English].

K. has classified streptococci according to their haemolytic reactions on 1% glucose horse-blood agar. Type I produce green rings surrounding the colonies on this medium, type II produce haemolytic rings, and type III also produce haemolytic rings on this medium, but on goat- or sheep-blood agar the surrounding zones are green. The relationship of these types to Lancefield's groups is as follows :– type I corresponds to groups A and B, type II appears to include groups C, E, F, G, and H, and type III is related to group D. The authors have noted a strain of streptococcus which has changed its group from G to C.

[The value of K.'s classification is not apparent as it does not separate the haemolytic streptococci in the clear-cut manner that Lancefield's method does, particularly in relation to habitat.]—D. L. HUGHES.

PORCH, M. L. (1941). **A Bacteriological Study of Streptococci Isolated from the Genito-Urinary Tract.**—*J. Bact.* **41.** 485–494.

Of 100 strains of streptococci isolated from the human genito-urinary tract, 76 had γ characteristics in respect of haemolysis : 73 of these were serologically members of Lancefield's group D, 70 being typical enterococci of the *Str. faecalis* type, and three of the *Str. liquefaciens* type. The other 24 strains had α characteristics and are classed as *Str. mitis*, *Str. salivarius*, *Str. faecalis*, and *Str. equinus*. All the *Str. equinus* strains and some of the *Str. mitis* reacted with Lancefield group B sera, although apparently the reactions were somewhat delayed. Enterococci are thus the predominant group isolated and it is suggested that the resistance of many genito-urinary infections may be associated with this fact.—A. W. STABLEFORTH.

LICHSTEIN, H. C., & SNYDER, M. L. (1941). **The Inhibition of the Spreading Growth of Proteus and other Bacteria to Permit the Isolation of Associated Streptococci.**—*J. Bact.* **42.** 653–664.

Methods designed to prevent the spread of *Proteus* and other bacteria with similar properties, to allow the isolation of streptococci, were compared. The methods were divided into three categories, *viz*, reduction of the fluid content of the medium, the use of chemicals incorporated in the medium, and the addition of specific antisera to the medium. Of the physical methods the best results were obtained with blood agar containing 6% sodium chloride, but this concentration tended to inhibit the growth of β-haemolytic streptococci. A 2% concentration of antiserum in the medium was found necessary to inhibit the spread of the homologous *Proteus* strain, while little or no effect was observed on heterologous strains. The most successful results were obtained by the use of chemicals. Alcohol and sodium azide prevented spread, but alcohol had the disadvantage of causing complete haemolysis in a blood-agar plate, thus preventing the differentiation of streptococci by their haemolytic characters. The most effective method

was the use of sodium azide, which, in concentrations of 1 : 5,000 prevented the growth of *Proteus* while in no way affecting the growth characters of the streptococci. —K. C. SELLERS.

MACKIE, T. J. (1940). **Some Aspects of Streptococcal Infection. A Review.**—*Edinb. med. J.* **47.** 466–485.
Although little mention is made of the streptococcal groups commonly met with in veterinary practice, this review should be of great interest to those studying the epidemiology of streptococci and their role in disease. —K. C. SELLERS.

SMITH, W. (1941). **Cervical Abscesses of Guinea-Pigs.** —*J. Path. Bact.* **53.** 29–37.
From chronic abscesses originating in the submaxillary lymph nodes, S. isolated organisms belonging to the *Streptobacillus moniliformis* (*Asterococcus muris*) group. Isolation was more readily accomplished by preliminary passage through the mouse, rabbit, or another g. pig than by direct culture. Examination of the cultures suggested the possibility of a developmental cycle. Under dark-ground illumination groups of organisms consisting entirely of bacillary elements were seen to disintegrate into a mass of spheres, globoid bodies, and granules. Occasionally bacilli were seen to be regenerated from the globoid bodies. No filtrable forms or symbionts could be demonstrated. The organism could be propagated on the chorio-allantoic membrane of the chick embryo. In all the species of animals that were susceptible, the essential lesion was chronic abscess formation. One small feeding experiment was successful in reproducing the disease, but a second was quite unsuccessful.—J. S. PATERSON.

*WOLF, S. (1940). Die Rolle der Haut bei der Milzbrand-, Geflügelcholera- und Schweinerotlauf-Infektion. **[The Role of the Skin in Anthrax, Fowl Cholera, and Swine Erysipelas].**—*Vet. Arhiv.* 541. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **48.** 612].
In these experiments care was taken to prevent infection of the skin by the inoculation needle.

All of 15 g. pigs infected intramuscularly with anthrax died, as did also 14 out of 20 inoculated intraperitoneally and all of seven (controls) infected intradermally. Five rabbits inoculated intramuscularly and three intradermally (controls) also died.

All of 15 pigeons infected intramuscularly with *Pasteurella avisептica*, as well as seven infected intradermally (controls), died of fowl cholera.

Twelve out of 15 pigeons infected intramuscularly with *Erysipelothrix rhusiopathiae*, as well as nine infected intradermally (controls), died from the infection.

*BALTEANU, I., FRANCKE, M., & POPA, F. (1940). Consideraţiuni epidemiologice şi profilactice in infecţia carbunoasa (cu ocazia a trei epidemii rurale). **[Anthrax in Rumania].**—*Rev. Igiena soc.* **10.** 53–60. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Oct. 31st. 532. (1941)].
Three outbreaks of anthrax in the regions of Jassy and Balti, involving many human cases, demonstrate the need for more effective control. Compulsory notification of human and animal cases is urged.

—. (1940). Faellesmødet mellem Dansk Tuberkuloselaegeselskab og den danske Dyrlaegeforening den 21. Oktober 1939. **[Joint Meeting of the Danish Tuberculosis Society and the Danish Veterinary Association, October, 1939].**—*Medlemsbl. danske Dyrlaegeforen.* **23.** 21–33 and 41–59.
PLUM read a paper on the spread of TB. between cattle and man and described the difficulties this causes in the control of bovine TB. He gave particulars of four instances in which cattle had become infected by farm personnel with the human type bacillus and of 16 instances of the transmission by farm workers to cattle of bovine type infection. The former phenomenon is more a nuisance in the resultant confusion at tuberculin retesting than it is a danger, but the latter gives rise to various grave losses and difficulties. When many reactions are suddenly obtained in a previously clean herd a farm worker may be suspected, but it is very difficult to prove the worker to be the source of the new infection, as the farmer tends to be uncooperative from choice or from economic needs. The Danish veterinary authorities proposed a clause in a newly projected law on TB., requiring that persons on a farm where new infection has occurred must be examined for TB., but this clause was modified so that it became ineffective. P. discussed ways in which doctors and hospital directors may co-operate to examine farm personnel, and other speakers gave their views, all referring to the complexity and size of the problem, and concluding that it could not be hoped that what was desirable could be completely effected with existing facilities. BEGTRUP-HANSEN and SIGURDSSON gave some figures about numbers of cases of bovine type infection in man in different localities in Denmark.

The most important need was for legislation to enable the proper measures to be carried out on the country population, in order to ensure that there was no chance of any tuberculous person having contact with farm animals or milk.—J. E.

—. (1941). Sverige. Kungl. Maj : ts proposition nr 152 till riksdagen angående det statsunderstödda bekämpandet av tuberkulos hos nötkreatur given Stockholms slott den 7 mars 1941. **[Sweden : Royal Proposition No. 152 to the Riksdag on State-Aided Campaign against Bovine TB.]**—*Skand. VetTidskr.* **31.** 255.
Proposals are made to institute " TB.-free areas " (the islands Gotland and Öland and the six northern provinces), in which all reactors to the tuberculin test would be slaughtered and none but TB.-free cattle would be allowed entry, and to institute " protected areas " (in certain parts of the provinces of Värmland, Örebro, Västmanland, Uppsala and Stockholm) in which all reactors would be marked [and presumably placed under suitable control]. No tuberculin testing except that by the Board of Health officials would be allowed, and steps would be taken to prevent the introduction of infected animals. [Abst. made from a commentary by SVEN WALL, a co-editor : the full draft proposition is not published in the above journal.]—J. E.

*NIELSEN, F. W. (1941). Om Statstilskud til den mejerikredsvise Udrensning af Kvaegtuberkulosen. **[State Support to Dairy Districts for the Eradication of Bovine TB.]**—*Medlemsbl. danske Dyrlaegeforen.* p. 196. [Abst. from abst. in *Skand. VetTidskr.* **31.** 230 and 234].
In 1932 a Danish law enacted that if any dairy area, in which at least 90% of herds were free from TB., so requested the remaining herds were to be compulsorily tested and reacting cattle slaughtered. This led to opposition and so failed to achieve its objects. In 1937 the State offered compensation for the reactors, whilst the dairies were empowered to pay a lower price for the milk from the untested minority. Dairies authorized to apply this scheme automatically bound themselves to undertake the testing of all herds in their area for the ensuing ten years, but could get State compensation for all reactors which were slaughtered within one month of detection. Any supplementary testing which the State considered advisable was to be paid for by the Government. These arrangements have led to some progress.

Thus from 1932–39, 95 dairies availed themselves of State aid to eradicate TB., whilst 137 dairies entered the scheme between 1939 and 1941.—G. B. BROOK.

MÄDER, W. (1940). Die Aufgaben des Tierarztes bei der Tuberkulosebekämpfung. **[Problems of the Veterinarian in TB. Control]**.—*Berl. Münch. tierärztl. Wschr.* Aug. 16th. 393–398.

M. looks forward in an eminently practical article to the time when the German diseases of animals regulations will embrace the eradication of TB. He emphasizes the importance of the herd owner's full co-operation with his veterinary adviser and envisages a voluntary scheme which would, however, in effect become compelling by virtue of the branding of every animal in the State (with six letters of the alphabet, this giving 244 million possible " numbers ", sufficient to cover a period of ten years), the initial testing of all animals within a period of a few months, public register of all clean herds, and prohibition of sale from infected herds, except for slaughter after a given period. Pressure would also be exerted by establishing special creameries for TB.-free herds and by making a report to the medical authorities of particularly bad herds, which might be recorded as directly dangerous to human beings.

Use would be made of both the tuberculin test and tests for diagnosis of " open ", non-allergic cases which might otherwise escape detection. No distinction would, however, be made between animals detected by these two methods. The single intradermal tuberculin test would be used and no measurements taken except in doubtful cases. Stress is laid on the number of animals which can be tested both with tuberculin and by the tracheal swab and other methods for the detection of " open " cases, provided plenty of help is provided in a well organized system. As an example, M. states that with three helpers he examined 460 animals in 122 herds in two days, finding 60 suspect cases, and that he took duplicate swabs with Scharr's cannula and Rautmann's mucus collector from these 60 animals in an afternoon, repeating the test on 40 which were negative the first time and finding tubercle bacilli in 40 animals in all, *i.e.* over 8% of the total examined. He is emphatic that these tests should be made at short intervals and tuberculin tests every six months. The provision of lists of animals would be the job of the local authority and the veterinarian would be able to confine himself to diagnosis and advice.

The advice to be given to the farmer to prevent spread is discussed at some length, particularly with regard to adequate nutrition and to avoidance of aerial spread in winter. It is suggested that smaller farmers should combine for the rearing of clean calves properly segregated from adult cattle. M. believes that no great difficulty would be found in eradicating TB. from the smaller herds, but he anticipates some difficulty in large herds.—A. W. STABLEFORTH.

HALL, O. (1941). **Present Status of Tuberculosis Eradication in Canada.**—*Canad. J. comp. Med.* **5.** 75–77.

Although the progress of TB. eradication in Canada has not been as rapid as in the U.S.A., by December 15th, 1940, 3,919,991 cattle had been tested under the various departmental policies, out of a total of 8,474,600, and 957,100 were awaiting the initial test. From the available figures it appears that not more than 2% of Canadian cattle are tuberculous.—CHAS. A. MITCHELL.

*CHRISTENSEN, A. N. (1940). Undersøgelse vedrørende Svinetuberkulosens Forekomst og Smittevej samt Forsøg paa Bekaempelse af Svinetuberkulose indenfor et Slagteris Omraade. **[TB. in Swine and an Attempt to Control It in an Area around an Abattoir]**.—*Maanedskr. Dyrlaeg.* pp. 485 and 517. [Abst. from abst. in *Skand. VetTidskr.* **31.** 119].

Tuberculous pig carcasses detected in a co-operative abattoir in Denmark were examined and the type and source of infection determined. Visits were made to the farms involved and measures instituted to prevent further infection. By such means the incidence of TB. was reduced from 6·95% in 1935 to 4·5% in 1938. Bovine infections fell by 37% and avian by 39%. Bovine type TB. in swine is contracted if the swine cohabit with cattle, are fed on mixed milk or improperly pasteurized skim milk, or come into contact with cow manure. Avian infection, which is the more difficult to combat, results from the ingestion of infective droppings. The average incidence of TB. in porcine carcasses in 1935 and 1938 throughout Denmark was 4·26 and 4·29% respectively and in swine abattoirs it was 4·35 and 4·26%.—G. B. BROOK.

*DIECKMANN, H. (1940). Untersuchungen über Form und Verlauf der Tuberkulose bei Schlachtschweinen. **[Form and Course of TB. in Slaughter Swine]**.—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 76].

Five hundred swine imported from the Baltic States were examined at Wismar abattoir. 283 cases of primary complex were found, 177 cases showed more advanced infection, and there were 37 cases of generalization, including two of miliary TB. from primary infection and one from reinfection, the latter observation being noteworthy in the pig.

Every case except three was infected through the digestive tract and the spread of infection in the body was by lympho-haematogenous routes, chiefly by the thoracic duct.

LÁSZLÓ, F. (1941). Tuberkulose der Nebennieren bei Schweinen. **[TB. of the Adrenal Glands in Pigs]**.—*Dtsch. tierärztl. Wschr.* **49.** 464–465.

A brief account of three cases seen at the abattoir at Györ (Hungary). TB. of both adrenals did not result in pigmentation of the type seen in Addison's disease in man.—E. G. WHITE.

LARSEN, G. (1940). Om 3 nyere metoder til påvising av tuberkelbasiller. **[On Three New Methods for Identification of Tubercle Bacilli]**.—*Nord. Med.* **8.** 1874–1879. [English summary]. [Abst. in *Tubercle, Lond.* **22.** 227, copied *verbatim*].

Larsen compares the fluorescine microscopy of Hagemann, Ronchese's homogenization of sputum and V. Hallberg's ' light blue ' stain with the ordinary Ziehl-Neelsen stain, and came to the following conclusions : The Ronchese method is inferior to the other two methods, which in turn yield decidedly better results than the Ziehl-Neelsen stain. Hagemann's method is the best. Among the positive sputa found by this method tubercle bacilli were found in 88·9 per cent, as compared with 79·4 per cent found by the Ziehl-Neelsen stain. The Hagemann method may be used for examination of all excreta, but is useless in the case of stomach washings.

SEIBERT, F. B. (1941). **The Chemistry of the Proteins of the Acid-Fast Bacilli.**—*Bact. Rev.* **5.** 69–95.

A valuable review article, with 96 references to literature from the time of KOCH to the present day, which should be read in the original by veterinarians interested in the diagnosis of infection in domestic animals with acid-fast bacilli by means of reactions analogous to " tuberculin testing ".

The conclusion that the specific active principle of tuberculin is a protein is supported by convincing evidence, and earlier divergent views are explained by

the existence of a complex relationship between the protein, nucleic acid, and polysaccharide molecules in bacterial filtrates. Physicochemical studies have shown that tuberculin proteins of various sizes, even down to a molecular weight of 9,000, may be equally potent and that antigenicity rises with increasing molecular weight. Fractions of M.W. 17,000 have considerable antigenicity, and fractions of 32,000 or more, isolated from untreated filtrate, are still more antigenic. Although the earlier view that fractions of M.W. as low as 2,000 are potent is no longer upheld, the biological potency appears to reside in some small relatively stable part of the protein molecule, and the larger molecular aggregates may suffer many changes before loss of potency occurs. Tuberculin protein in its original form as produced by the bacillus may be regarded as a " reversibly dissociable component system " which consists of active protein, inactive protein, nucleic acid, and polysaccharide. The relative proportions of these components, and the properties of potency, specificity, toxicity, and antigenicity, may depend upon the degree of dilution and the reagents used for isolating particular fractions. The mechanism of " denaturation " of tuberculin protein is discussed.

From the practical point of view the chemical studies have led to the production of a purified and highly potent protein derivative (P.P.D.) suitable for use as an official standard in human medicine.

Protein derivatives of several other acid-fast bacilli have also been isolated by methods similar to those adopted for the human strain of *Mycobacterium tuberculosis*, and shown to be biologically different. Recent work indicates that a serological group-specificity exists in the polysaccharides, while a type specificity is inherent in the proteins of these bacilli.

[With regard to the suggested " official standard " it should be noted that this refers to human P.P.D. and would therefore be the standard for testing homologous products. It could obviously not be adopted for determining " potency " of protein derivatives derived from avian strains, or from Johne's bacillus, where the " specificity factor " is very large. For veterinary use a series of specific standards are required for purposes of differential diagnosis in various domesticated animals.]

—H. H. GREEN.

LONG, E. R. (1941). **Constitution and Related Factors in Resistance to Tuberculosis.**—*Arch. Path.* **32.** 122–162 and 286–310.

This article is essentially a review of the influence of environment and other factors on susceptibility and resistance to TB. It does not lend itself to abstraction.

—R. E. GLOVER.

KÖHLER. (1941). Malleus. **[Glanders].**—*Z. Veterinärk.* **53.** 201.

During the autumn of 1940 Spahi cavalry in France mounted on Barbary stallions were unable to return to Morocco and were forced to remain in the unfamiliar climate. As a result many of the horses developed acute glanders following the long-standing chronic lesions which were frequent. Acute glanders also developed in some animals as a sequel to castration. The first cases of glanders which developed were not diagnosed as such, but were considered to be respiratory catarrh of a type often seen in Barbary stallions.—E. G. WHITE.

BREITHOR. (1941). Serologisch und durch die Augenprobe nicht feststellbaren Malleus. **[A Case of Glanders Negative to the Mallein and Serological Tests].**—*Z. Veterinärk.* **53.** 134.

A grey Percheron horse in France was slaughtered after showing a bilateral yellowish nasal discharge and loss of condition. Autopsy revealed widespread chronic glanders with recent acute lesions in the lungs. Two months before slaughter the animal had failed to react to the ophthalmic mallein and serological tests. A tumour-like mass on one fore limb, believed to be a melanotic sarcoma, proved to be a large glanders nodule.

—E. G. WHITE.

SPENCER, W. T. (1941). **The Sectional Incidence of Swine Erysipelas in the United States.**—*J. Amer. vet. med. Ass.* **99.** 229–232.

Swine erysipelas has existed in the U.S.A. for a considerable time, and became of economic importance in 1931 when severe outbreaks occurred in South Dakota and Nebraska. Since then it has spread to most of the important pig-producing states, especially through the agency of community pig sales. Articular infections, which have been proved to be largely due to S.E. infection, have been responsible for heavy condemnations of carcasses at inspected packing plants (up to 3·75% of pigs slaughtered). At these plants there has been an increase of condemnations because of bone disease from 0·0001% in 1919 to 0·21% in 1939. The incidence of arthritis and ensuing condemnations are tabulated from data obtained by the Bureau of Animal Industry through their chief meat inspectors during a 20-day period in 1939; a further questionnaire showed a much reduced loss from this condition in 1940. This emphasizes the varying morbidity of this disease from year to year.—C. V. WATKINS.

HARVEY, P. C., & FABER, J. E. (1941). **Studies of the Listerella Group. I. Biochemical and Hemolytic Reactions.**—*J. Bact.* **42.** 677–687.

A biochemical examination was made of 50 strains of the listerella group, representative of all known animal hosts. All strains produced acid in glucose, laevulose, galactose, maltose, mannose, rhamnose, trehalose, dextrin, and salicin; variable results were obtained with lactose, glycerol, sucrose, arabinose, xylose, mannite, sorbitol, and starch; dulcitol, inositol, raffinose, glycogen, and inulin were not fermented. The authors suggest a division of the strains on the basis of acid production from melezitose as there is indication of a correlation of this test with Paterson's serological types. The methyl-red test was positive, while all the strains examined possessed the property of producing β haemolysis on blood-agar plates.

A concise historical review is presented of previous publications on the listerella group.—K. C. SELLERS.

I. HENDERSON, J. A. (1941). **An Outbreak of Listeriosis in Sheep.**—*N. Amer. Vet.* **22.** 545–546.

II. JENSEN, G. W., & GAY, W. J. (1941). **Ovine Listerellosis. Report of an Outbreak in a Purebred Flock.**—*Ibid.* 601–605.

I. The history and symptoms of an outbreak of listerellosis, causing intermittent deaths for four months, are described in a flock of 860 ewes and 34 rams, in which an outbreak of the infection during the preceding winter had caused the death of about 40 ewes. The mortality in the second outbreak was 55 ewes, 2 rams, and 19 lambs. Subcutaneous vaccination with formolized, autogenous listerella culture did not materially reduce the mortality rate, although H. recommends further trials with larger doses. Treatment with sulphanilamide, although not promising, is also recommended for further trial. Clinical signs of the disease subsided upon transfer of the flock to pasture.

II. A review of the literature on ovine listerellosis is followed by a description of an outbreak amongst 300 sheep; the outbreak lasted over four months, and about 100 sheep were lost. Although several lambs as well as pregnant ewes died during the outbreak, no case of

abortion was noted. Three goats, used for fostering orphan lambs of which two died, eventually sickened and died towards the end of the outbreak. A fairly constant and early symptom of the disease was the conspicuous dropping of one ear, suggestive of unilateral nervous involvement; pharyngeal paralysis was a later feature. A diagnosis of listerellosis was based on clinical symptoms, microscopic cerebral changes, and results of bacteriological examination. Treatment with a combination of neoprontosil intravenously and sulphanilamide orally appeared to give best results, but the number of sheep so treated was too small to permit any significant conclusion. The administration of large doses of sulphanilamide (360 grains per day) at the outset of the disease is recommended, since later treatment with repeated smaller doses is rendered difficult by pharyngeal paralysis.—R. O. MUIR.

PÖRSCHMANN, H. (1940). Läppchenkrankheit (Chronische Geflügelcholera) in einem Farmbetrieb. **[Wattle Disease (Chronic Fowl Cholera)].**—*Berl. Münch. tierärztl. Wschr.* Oct. 25th. 517–519.

P. gives a detailed description of an outbreak of the more chronic wattle form of fowl cholera which occurred in a pedigree flock of White Leghorns. The P.M. lesions of 26 birds are given in detail together with the biochemical and cultural characters of the bipolar organism isolated from a number of carcasses. These organisms are compared with those of a strain isolated from an outbreak of the acute type.

The P.M. lesions were very variable and not characteristic and the strain of organism from the acute outbreak differed from the "wattle" strain only in its method of growth in broth and in its pathogenicity for mice. It was frequently difficult to isolate an organism from affected wattles.

Although in the outbreak described 20 birds died, the disease was by no means fatal, a number of birds recovering spontaneously. The swollen wattles often developed necrotic areas following injury, which resulted in the sloughing of considerable portions.

P. points out that the disease is most common during spells of very severe weather and he suggests that malnutrition plays an important part in its development. [See also WAGENER & MATZKE.—*V. B.* **12.** 138.]

—N. S. BARRON.

EDWARDS, P. R., & TAYLOR, E. L. (1941). **Shigella equirulis Infection in a Sow.**—*Cornell Vet.* **31.** 392–393.

LUTJE (1924–25) and CLARENBURG (1924) have recorded pig infections with *Bacterium equirulis*. The present authors describe a case in which all of eight full-term piglets were born weak and died in a few days; the sow died a week after farrowing. There was acute purulent metritis and *Bact. equirulis* was isolated from the uterus and from the bloodstream. The farm had been used for breeding thoroughbred horses for many years.

—C. V. WATKINS.

REUTER, H. (1940). Untersuchungen über die biochemischen und serologischen Eigenschaften des Bact. Abortus ovis. **[Biochemical and Serological Characters of *Salmonella abortus-ovis*].**—*Z. InfektKr. Haustiere.* **56.** 44–64.

The cultural, biochemical, and serological properties of 33 strains of *S. abortus-ovis* were investigated. Growth was scanty on all media, particularly on brilliant green phenol red agar. No alkalization of this medium took place.

For fermentation tests, Hottinger's ox-testicle broth was used as a substrate. Mannite was fermented by most strains with the formation of acid and some gas. Dulcite was attacked by all strains. Lactose, saccharose, adonite, indole, and salicin were left unchanged in all cases, while arabinose and rhamnose were fermented only in a few instances. Weak but permanent reddening of litmus milk was produced by the majority of strains.

Suspensions of *S. abortus-ovis* were agglutinated by sera prepared against *S. typhi-murium*, *S. schottmuelleri*, *S. brandenburg*, and *S. abortus-equi*. In no case did the titre reach the limit obtained when a bacterial suspension homologous with each of these sera was used. *S. enteritidis* sera were agglutinated to titres of 1 : 200–1 : 400.

The O factor (group) "B" was demonstrated in all strains. The H factor "C" was found in every case, but again did not reach the "titre-limit".—M. LANDAU.

EDWARDS, P. R., & BRUNER, D. W. (1941). **Two New *Salmonella* Types Closely Related to *Salmonella muenchen*.**—*Amer. J. Hyg.* Sect. B. **34.** 121–124. [Authors' summary copied *verbatim*].

Two new *Salmonella* species closely related to *S. muenchen* are described. The first, *S. oregon*, has the antigenic formula VI VIII : d—1, 2, 3 and is represented by 6 cultures from hogs and turkeys. The second, *S. manhattan*, has the antigenic formula VI VIII : d—1, 5 . . . and is represented by 2 cultures from chickens and turkeys. The specific phases of the 2 types are identical and, while closely related to the specific phase of *S. muenchen*, can be distinguished from the latter by agglutinin absorption tests.

SCHIFF, F., BORNSTEIN, S., & SAPHRA, I. (1941). **The Occurrence of Salmonella O-Antigens in Coliform Organisms.**—*J. Immunol.* **40.** 365–372.

Five non- or late-lactose fermenting coliform strains of undetermined pathogenicity, isolated from human faeces, were tested by tube and slide agglutination and by agglutinin-absorption with 20 salmonella O-immune sera (Kauffmann). Although the flagellar antigens of all five strains were unrelated to salmonella flagellar antigens, in one case the O-antigen corresponded with that of *S. onderstepoort*, and in another with that of *S. worthington*, while in four cases components of the O-antigens of *S. worthington*, *S. poona*, and the O-antigen I occurred together with residual non-salmonella antigenic compounds. The presence of salmonella O-antigen I in a coliform organism was considered noteworthy because of its wide distribution throughout many salmonella types of various groups.—R. O. MUIR.

*HOHN, E. A. (1940). Ueber das Vorkommen von hämoglobinophilen Bakterien bei Hühnern. **[The Occurrence of Haemoglobinophilic Bacteria in Fowls].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 344].

Haemoglobinophilic bacteria were isolated from the nasal mucosa of two out of 191 clinically healthy hens, but not from 52 hens with coryza.

The two strains resembled swine influenza bacteria. They were incapable of causing coryza in fowls.

DELAPLANE, J. P., & STUART, H. O. (1941). **A Study of the C Factor as a Requirement for Growth of Hemophilus Gallinarum.**—*J. agric. Res.* **63.** 29–30.

Previous work had shown that some substance (C factor) present in chicken blood serum, necessary for the growth of *H. gallinarum*, was partially but not completely destroyed by boiling. The serum used in the present study was diluted with three parts of a 1% sodium citrate saline solution, and this did not coagulate on boiling or autoclaving. The serum thus prepared was used with nutrient broth and at the base of nutrient agar slopes for cultural tests. Boiled preparations of the serum (and plasma) were centrifuged, filtered through paper, and sterilized by passing through bacteriological

filters. The test organisms were two strains of *H. gallinarum* and a smooth strain of *H. influenzae*, and the tests were carried out with serum boiled or autoclaved for periods of 5, 10, and 15 min. The results indicated that whereas boiling the plasma or serum did not destroy the factor necessary for growth, autoclaving was definitely inimical. The authors suggest that the previously reported destruction of the C factor by boiling results from physical changes in the medium, and that the C factor is of a physical rather than a chemical or nutrient nature. *H. influenzae* also grew well with boiled citrated serum or plasma, but not in bacterial filtrates of the same material.—ALFRED EDEN.

GARDNER, V. R. (1941). **Brucellosis (Bang's Disease and Undulant Fever). The Story of Research Dealing with their Interrelationships.**—*Quart. Bull. Mich. agric. Exp. Sta.* **23.** 207–210.

Briefly reviews the history and progress of research on *Br. abortus* in the U.S.A. Brucellergen for use in diagnosis and brucellin as a curative agent have been developed at the Michigan experiment station. Studies on brucellosis at this station have continued since 1915, with the aid of various grants.—S. J. GILBERT.

HUDDLESON, I. F., ARDREY, W. B., PENNELL, R. B., STAHL, W. H., HAMANN, E. E., & MUNGER, M. (1941). **Studies in Brucellosis.**—*Tech. Bull. Mich. agric. Exp. Sta.* No. 177. pp. 55.

A study of factors influencing the isolation, cultivation and differentiation of the species of Brucella. [ARDREY, W. B.]—The study concerns essentially the value of the addition of peptone to beef-liver infusion agar for the above purposes and a comparison of such media with tryptose agar. Neo-peptone and proteose-peptone promoted slightly better growth than bacto-peptone and all were better at 0·5% than at 1% whilst 0·25% was also satisfactory. Bacto-tryptone showed the poorest results. Bacto-tryptose agar (*i.e.* the medium containing 2% tryptose peptone, 0·5% sodium chloride, 0·1% dextrose, and 2% agar, prepared by Difco) was also studied and gave the largest number of colonies but of small size. Bacto-peptone and tryptose agar were used in the remainder of the work.

When beef-liver agar containing 0·5% bacto-peptone in crystal violet plates is used, a concentration of 1 : 700,000 is recommended.

The bacteriostatic action of thionin and basic fuchsin is influenced by the pH of the medium and concentration of peptone present. The reduction of the dye sometimes found after pouring plates appears to be a property of certain lots of liver infusion. Both dyes were more bacteriostatic in tryptose agar, but in a dilution of 1 : 100,000 gave perfect differentiation.

The presence of a capsule on brucella cells [HUDDLESON, I. F.]—A method for demonstrating a capsule on brucella and other bacteria possessing a capsule is described. Only smooth and intermediate forms have been shown to possess this capsule. It is believed that the greater the amount of capsular substance inside the capsule, the more intense is its colour when stained, and that the virulence of a strain is determined by the presence of a capsule and the amount of capsular material.

Study of cross skin sensitization between Past. tularensis *and* Br. melitensis. [PENNEL, R. B., & HUDDLESON, I.F.]—No evidence was found of cross-sensitization when rabbits immunized to one or other of the two organisms were skin tested with a protein-nucleate solution from the other. It is suggested that such a skin test made with protein nucleate might be a service or a differential test.

The immunizing value of the gluco-lipid antigen from brucella cells. [STAHL, W. H., & HAMANN, E. E.]—G. pigs were injected intradermally with 10 mg. of the gluco-lipid antigen fraction of *Br. abortus* cells, prepared by the method of BOIVIN & MESROBEANU, given in three doses at intervals of seven days. One month later all were injected with 1,000,000 virulent *Br. abortus*, controls being also injected. Groups were killed after 2, 4, and 6 months. Of 21 treated g. pigs 19 were infected, whilst of 14 controls, ten were infected.

Conditions for maximum precipitation and agglutination of antibody in various brucella antiserums. [STAHL, W. H., & PENNELL, R. B.]—The data show that for establishment of a true equilibrium or precipitation of the maximum amount of brucella antibody nitrogen, the following conditions must be maintained :—(1) for human antiserum and endoantigen, 4°C. for 48 hours ; (2) for g. pig antiserum and endoantigen, 37°C. for 24 hours ; (3) for goat antiserum and endoantigen (homologous or heterologous), 37°C. for 2 hours, 4°C. for 22 hours ; (4) for cow antiserum and endoantigen, 37°C. for 2 hours, 4°C. for 22 hours ; (5) for purified and unpurified cow antiserum and gluco-lipid antigen, 4°C. for 48 hours. To obtain maximum removal of brucella agglutinin antibody nitrogen, it was found necessary to maintain the following conditions :—(1) for human antiserum and homologous cells, 37°C. for 48 hours ; (2) for g. pig antiserum and homologous cells, 4°C. for 24 hours ; (3) for cow antiserum and homologous cells, 4°C. for 48 hours ; (4) for goat antiserum and homologous cells 4°C. for 48 hours.

The presence of brucella antibody in the urine of human beings. [PENNELL, R. B.]—The urine of certain human patients, particularly severe cases, was found to contain antibody. The amount was determined quantitatively and by precipitation tests. It could be concentrated by dialysing the urine against water, suspending the precipitate in saline, adding pepsin at pH 4·3, and centrifuging after 24 hours at room temperature, the concentrated antibody then remaining in the supernatant.

Separation and study of the lipid fraction of Brucella abortus. [STAHL, W. H.]—The strain used was virulent and smooth. The lipids were found to form about 5–6% of the weight of the dried cells. The alcohol-ether soluble lipids were separated into approximately 27% acetone-soluble fat and 73% phosphatide. The phosphatide on hydrolysis with aqueous sulphuric acid gave fatty acids, glycerophosphoric acid, and ethanolamine. The presence of choline is postulated. The acetone-soluble fat gave on saponification, glycerol and fatty acids. An unidentified crystalline compound containing carbon, hydrogen, and sulphur was isolated from the chloroform-soluble fraction. An examination for so-called " bound lipids " was made, yielding only a very small amount of a glyceride composed mainly of fatty acids with the probable presence of some polysaccharide. The lipids may be chemical constituents of the capsular substance of brucella. The lipids of brucella are biologically inactive.

A study of the leucocytic picture in brucellosis. [MUNGER, M.]—Details are given of 76 cases of acute *Br. melitensis* infection in Malta.

A study of the effect of the toxic fraction from brucella cells on the leucocyte picture of normal guinea pigs. [MUNGER, M.]—The material used was the gluco-lipid fraction obtained by the method of BOIVIN & MESROBEANU. After the injection of lethal or sublethal doses a reduction of about 70% in the peripheral leucocyte count occurred within 15–30 min. The count and percentage of the different leucocytes varied in different organs. The loss in peripheral leucocytes could not, however, be accounted for by their migration to the internal tissues. An extract from pieces of stomach or

intestine after incubation with the toxic fraction produced *in vitro* a 50% reduction of leucocytes in whole citrated blood.

The uric acid of the urine was increased nearly 260% after injection of the toxic fraction. Data obtained are believed to indicate that the toxic fraction added by tissues of the gastro-intestinal tract had a cytolytic action on neutrophiles in the blood vessels.—A. W. S.

—. (1941). **[Report of Committee on] Bang's Disease.**—*J. Amer. vet. Med. Ass.* **99.** 446–447.

In the U.S.A. there were 391 counties in 23 states classified as "modified accredited", 93 of which were added during the year under review. In addition, area testing was being conducted in about 200 counties.

Three general plans of control were in operation :– (1) test and immediate elimination with indemnities ; (2) test and immediate elimination with calfhood vaccination and indemnities ; (3) test and gradual elimination with calfhood vaccination and without indemnities.

Calfhood vaccination had been incorporated in official disease control work in 33 states. Four other states had plans for incorporation under consideration.
—D. D. Ogilvie.

Duckworth, C. U. (1941). **Which Way Brucellosis Control ?**—*J. Amer. vet. med. Ass.* **99.** 462–464.

D. discusses whether officials or practitioners should carry out calf vaccination. He suggests that practitioners should vaccinate under contract with owners and in this way they can perform much of their normal work when vaccination visits are made. The possibility of owners purchasing vaccine privately is mentioned.—S. J. G.

Fitch, C. P., Boyd, W. L., Kelly, M. D., & Bishop, L. M. (1941). **An Extended Study of Female Offspring of Positive Bang's Diseased Cattle.**—*J. Amer. vet. med. Ass.* **99.** 413–414.

During the past seven years, observations have been made on a herd of 56 cows whose dams were known to be infected with Bang's disease. The herd was built up by removing each calf from its infected parent after it had been nursed for one week and adding it to other clean animals as soon as a negative titre was shown.

So far, 95 lactation periods, providing 257 milk samples and 93 placentas and colostrum samples, have been studied. In no instance has *Br. abortus* been isolated.

It is concluded that by early removal of calves a clean herd can be built up from infected animals with no danger of subsequent outbreaks from latent infection.
—D. D. Ogilvie.

Winter, A. (1941). **Calf Vaccination—United States Experimental Project (New York State).**—*Cornell Vet.* **31.** 355–360.

The project was started in 1936 in 25 herds containing 1,310 animals, of which 27% were reactors. At the time of writing, 1,172 negative calves had been vaccinated. Marked blood titres were shown within 30 days of vaccination. Fairly constant early physical reactions were noticeable following vaccination and two deaths occurred. About 80% of the vaccinated calves gave negative reactions within a 12-month period. Five of the herds were entirely negative to the agglutination test in 1941, while ten of the remaining herds had 1–3 reactors and suspects. In the group of vaccinated heifers there had been 978 pregnancy terminations. Thirty of these resulted in premature births at 57–262 days, nine of them being due to brucella infection.
—S. J. Gilbert.

Lamont, H. G., & Kerr, W. R. (1941). **Northern Ireland. Investigation by the Veterinary Research Division, Ministry of Agriculture.**—*Rep. agric. Res. Inst. N. Ire., 1940–41.* p. 18.

A progress report of a few lines only about a heifer-vaccination experiment in the control of brucellosis : results are not yet available.—J. E.

Eremin, V. M. (1939). Sobaki—istochnik rasprostraneniya brutsellesa sredi lyudeĭ i zhivotnykh v ovtsesovkhozakh Turkmenii. **[Dogs as Cause of Spread of Brucella Infection among Man and Animals in Sheep Farms of Turkmenia].**—*Sovyet. Vet.* No. 10–11. pp. 93–94.

In affected farms, dogs may become infected by devouring placentas, aborted lambs, uterine discharge, or the carcasses of newborn lambs used for astrakhan production. Twenty-one (28%) of 75 sheep dogs and 2 (16%) of 12 other dogs (having occasional contact with flocks) reacted positively to the agglutination test. *Brucella melitensis* was isolated from two dogs with titres of 1 : 800 and 1 : 1,600. It is recommended that farm dogs should be tested along with the flocks.—A. M.

Uvarov, A. A., & Suzdal'tsev, A. I. (1939). Opyt sanatsii brutselleznogo ovtsevodcheskogo khozyaĭstva na osnove vnutrikozhnoĭ allergicheskoĭ reaktsii s primeneniem brutsellizata VIEM. **[Experiences in Eradication of Brucella Infection from a Sheep Farm by Means of Intradermal Allergic Tests using Viem Brucellysate].**—*Sovyet. Vet.* No. 10–11. pp. 51–55. [See also *V. B.* **9.** 72].

Negative reactors were dipped and isolated and re-tested one month later. The test was made twice in 1936 and three times in 1937, the percentage incidence of reactors and doubtful reactors being 8·7, 1·6, 1·8, 1·3, and 0·4 respectively. Other preventive measures taken were the ploughing-up of infected pastures, disinfection of winter quarters, and serological examination of all other animals and of personnel who had access to the flock.

The flock consisted mainly of ewes 2–3 years old. After the first year the percentage of abortions and stillborn lambs was 1·2, 47% of these cases being due to brucellosis. On two infected control farms, stocked mostly with older ewes, there were 3·2% and 5·1% of abortions, 53% and 72% respectively being due to brucellosis.

After the second year the number of abortions and stillbirths rose to 3%, but only 1·7% (2 out of 108) were due to brucellosis. On the control farms there were 4·1% and 4% abortions, 30% being from brucellosis.

It is concluded that the brucellysate test can be successfully used in the eradication of brucellosis in sheep.—A. Moldawsky.

Hart, G. H., & Guilbert, H. R. (1941). **The Relation of Brucella Abortus Infection to the Vitamin A Content of Fetal Livers.**—*Amer. J. vet. Res.* **2.** 390–394.

The authors previously showed [*V. B.* **4.** 625.] that vitamin A deficiency could cause premature termination of pregnancy and that the differential diagnosis between this condition and infectious abortion could not be recognized clinically. Further investigations have shown that seven of 13 liver samples from foetuses aborted from cows which gave a positive reaction to *Br. abortus*, contained either no vitamin A or only a trace ; the A content of the other six samples was low, ranging from 1–5 blue units per g. Similar results were obtained from liver samples from nine aborted foetuses from both vaccinated and unvaccinated cows infected with a virulent strain of *Br. abortus*. Samples of liver from normal animals contained 5–100 blue units per g. These results indicate that brucella infection impairs the transfer of vitamin A from the maternal blood to the

foetus and it is emphasized that the possibility of brucella infection should be ruled out before a vitamin A deficiency is diagnosed as a cause of abortion.—R. A.

NATUCCI, G., & CELLA, C. (1939). Osservazioni anatomo-istologiche nell'infezione sperimentale da brucelle (melitense e Bang). [**Histology of Experimental Infections with** *Brucella abortus* **and** *Br. melitensis*].—*Sperimentale.* **93.** 243–299.

The authors injected live, virulent *Br. abortus* and *Br. melitensis* into the peritoneal cavity of g. pigs. This produced a sero-fibrinous inflammation of the peritoneum, some enlargement of the liver and spleen, and congestion of the thoracic and abdominal organs. The lesions were apparently identical for the two species of *Brucella*. Histologically, there was considerable hyperplasia of the reticulo-endothelial cells of the liver, lungs, and spleen.

G. pigs sensitized with repeated small doses of heat-killed cultures of the two species of *Brucella* developed great enlargement of the liver and spleen and widespread congestion, particularly of the lungs. The serous surfaces of the lungs, liver, and spleen showed miliary nodules. There was marked hyperplasia of the reticulo-endothelial cells especially in the lungs and spleen, and nodules were formed of endothelial and epithelioid cells with a slight infiltration of polymorphs and lymphocytes. The nodules also contained giant cells and a few plasma cells.

A single larger injection of heat-killed organisms directly into an organ (after laparotomy had been performed when necessary), produced a marked increase in size in the liver and spleen with miliary nodules on the serosae. Massive inoculations of killed organisms into the liver, spleen, lung, and testicle produced marked hyperplasia of the reticulo-endothelial cells with the formation of granulomas and atrophy of the parenchyma, notably in the testicle.

Injections of large doses of live or heat-killed organisms into previously sensitized animals produced death rapidly in as many as 57% of the animals. No difference in the lesions caused by the two species of *Brucella* could be noted. In previously sensitized g. pigs, the injection of live or killed organisms produced much more evident lesions with greater atrophy and cellular degeneration than in non-sensitized animals. The process of sensitization apparently rendered the animals hypersensitive and hyper-receptive to the organisms or their products.—MILLER WATSON.

KOSER, S. A., BRESLOVE, B. B., & DORFMAN, A. (1941). **Accessory Growth Factor Requirements of Some Representatives of the Brucella Group.**—*J. infect. Dis.* **69.** 114–124.

Seven out of eight strains of brucella grew satisfactorily on basal media consisting of amino acids, glucose, and inorganic salts supplemented with thiamin, nicotinamide, pantothenic acid, and biotin. Not all these factors were required by all strains. In four of the cultures nicotinamide and thiamin supported growth, although slowly, but the addition of pantothenic acid accelerated growth, while three of the remaining four strains grew when a biotin concentrate was also added. One strain was particularly dependent upon pantothenic acid and growth was more actively stimulated by the acid than by either of both parts of its molecule.

Other necessary factors studied which had no significant effect upon growth were riboflavin, vitamin B_6, adenine, inositol, and glutamine. Cocarboxylase was of no greater value than thiamin, nor coenzyme I than nicotinamide. Biotin appeared to be necessary for the growth of some but not all of the cultures studied, and thioglycollic acid behaved similarly. The suggestion is made that different strains of brucella vary in their oxidation-reduction potential requirements.

The effect of varying concentrations of NaCl was shown to be important in affecting growth. Optimum concentrations lay between 0·6 and 1·0%. With decreasing amounts of NaCl even in the presence of accessory growth factors, progressively slower growth occurred until at concentrations below 0·1% most cultures failed to grow. The effect appeared to be closely linked with osmotic factors, since KCl, Na_2SO_4 and K_2SO_4 could be substituted for NaCl.—A. EDEN.

*NAUMANN, H. (1940). Rauschbrandkarte für Grossdeutschland. [**A Blackleg Map for Greater Germany**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 343].

The dissertation is said to contain maps showing the density of blackleg 1929–38. The most heavily infected part of Germany was the government district of Aurich. In sheep, blackleg in epizootic form existed only in two areas, in Brunswick and Anhalt. In Austria the disease was prevalent in Styria. In Germany itself the incidence decreased during the above years, owing to energetic control measures, but in Austria it was most prevalent in 1938.

*LÜDERS, H. (1940). Ein Beitrag zur Rauschbrandfrage auf Grund von Untersuchungen und Erfahrungen in Ostfriesland. [**Experiences of Blackleg in East Friesland**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 73].

Observations elicited the fact that the type of soil has no influence on the incidence of blackleg, but that a high water table results in the spread of the bacilli in the soil. The former practice of burying carcasses contributed much to this effect.

Vaccination and the system of carcass disposal followed during recent years in Holland, and intensified in Germany, *i.e.* the collection of carcasses from the farms in special conveyances for disposal by passage through denaturing plants, should favour control of the disease. It is suggested that compensation for loss of animals from blackleg should be withheld unless vaccination has been applied.

DINTEĬ, Z. (1940). Prilog imunoprofilaksi plinovitih edema. [**Immunization against Gas Gangrene**].—*Vet. Arhiv.* **10.** 456–468. [Abst. from German summary].

D. attempted to immunize g. pigs and sheep simultaneously against infection by *Clostridium chauvoei, Cl. septique, Cl. welchii,* and *Cl. oedematiens* by means of a mixed formolized culture vaccine. Sheep were successfully immunized in this way against all but *Cl. oedematiens* and it is stated that no immunity against this could be produced by a *Cl. oedematiens* vaccine alone. Sheep were also immunized by a bivalent vaccine against *Cl. chauvoei* and *Cl. septique.*

G. pigs could not be immunized against any of the infections, either alone or collectively, with the exception of *Cl. chauvoei* infection.

Simultaneous polyvalent vaccination of sheep against gas oedema diseases is very desirable in Yugoslavia, in order to reduce the losses sustained after immunization against blackleg has been carried out.

*SZÉLYES, L. (1941). [**Tetanus Toxin-Combining Capacity of the Central Nervous System of Swine**].—*Közl. Összehas. élet- es kórtan Köréből.* **29.** 309. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 468].

A description of experiments showing that tetanus toxin is absorbable in normal brain or spinal cord suspensions.

Whether it is chemically or physically bound by the nerve tissue was not determined.

MACFARLANE, M. G., & KNIGHT, B. C. J. G. (1941). **The Biochemistry of Bacterial Toxins. I. The Lecithinase Activity of *Cl. welchii* Toxins.**—*Biochem. J.* **35.** 884–902.

The enzymatic activity and biochemical action of toxin prepared from culture filtrates of *Clostridium welchii* type A were investigated. Evidence is presented that this toxin contains a lecithinase which decomposes lecithin into phosphocholine and a diglyceride. It is shown that the lecithinase of the toxin is inhibited by specific antitoxic sera, the inhibitory action running parallel in various type A antisera with the protective power of the serum *in vivo*, while in two type C sera the antilecithinase activity agreed with an independent assay of the α-antitoxin content. It is suggested therefore that this lecithinase is identical with the specific α-toxin which is the lethal, haemolytic, and necrotic substance predominant in type A culture filtrates. The enzyme is relatively heat stable and is activated by Ca^{++} and inhibited by fluoride, citrate, and phosphate. The inhibitory effect on the enzyme of various antiseptics and nonspecific agents was investigated. Sulphanilamide and sulphapyridine had no appreciable effect and other bactericidal agents very little inhibitory action.

The methods are described for estimating the lecithinase activity of toxins and the corresponding antilecithinase activity of *Cl. welchii* antitoxic sera. The rate and amount of hydrolysis by the lecithinase, alone and in the presence of antitoxin, are greatly affected by the concentration of Ca^{++} present. Although the evidence indicates that the lecithinase activity in the type A toxins examined corresponds closely with the predominant lethal toxin, it is not quite so close as would be expected if the lecithinase were the sole agent in the biological effect, and two other factors at least must be taken into account, *viz*, hyaluronidase [see *V. B.* **11.** 616.] and the second haemolytic factor, θ toxin. Nevertheless, the lecithinase activity of type A toxins is a guide to their biological potency which can effect considerable economy in animal tests.—R. ALLCROFT.

POCHECHUEV, K., & AGALAROVA, A. (1939). Nekrobatsillez khvostov u buivolov. [**Caudal Necrobacillosis in Buffaloes**].—*Sovyet. Vet.* No. 10–11. pp. 94–95.

Short draught bars had been newly introduced in the buffalo carts and this led to bruising of the tails during work. *Fusiformis necrophorus* was demonstrated in necrotic lesions which resulted in the tail distal to the initial injury.—A. MOLDAWSKY.

RYFF, J. F. (1941). **Failure of Natural Vibrio Fetus Infection to Carry over in Ewes.**—*Amer. J. vet. Res.* **2.** 367–368.

A short report showing that an extensive infection of a flock of 79 ewes with *V. fetus*, as judged by cultural and agglutination tests, which resulted in the loss of 37 lambs from 28 ewes due to abortions, still births, and weakly lambs, was not carried over to the next season when only four lambs were lost, the causes of these deaths being unknown; two of these losses may have been due to *V. fetus*. No fresh animals were introduced into the flock between the two lambing periods.—J. S. P.

SAVOOR, S. R., & LEWTHWAITE, R. (1941). **The Weil-Felix Reaction in Experimental Rat-Bite Fever.**—*Brit. J. exp. Path.* **22.** 274–292.

It is recorded that the sera of rabbits experimentally infected with rat-bite fever develop agglutinins for the OXK strain of *Proteus vulgaris*, a serological response which has hitherto been regarded as pathognomonic of tsutsugamushi disease, or of infections with the *Proteus* OXK bacillus.

To the immobilization test, which is based on the presence of "spirillicidal" or "immobilizing" antibodies in the sera of infected animals, the sera of the infected rabbits gave positive results with *Spirillum minus*. Sera of rabbits infected with tsutsugamushi disease or immunized against an OXK strain of *P. vulgaris* gave negative immobilization tests.

It is concluded that a positive Weil-Felix reaction of the OXK type in rabbits infected with rat-bite fever indicates that an OXK component is present in an organism, *S. minus*, which is entirely unconnected with rickettsia in general and with *R. tsutsugamushi* in particular, and it is suggested that it may be shown that this common antigenic factor is a polysaccharide, varieties of which are known to occur in *Proteus* OX19 and in the rickettsia of murine typhus.—U. F. R.

I. HASSEGAWA, S., & KOCHI, M. (1939). Ueber die homogene Kultur der Actinomyzeten und ihre Veränderlichkeit. I. Mitteilung. [**Homogeneous Cultures of Actinomycetes and their Variability. I**].—*Jap. J. exp. Med.* **17.** 185–195. [In German].

II. HASSEGAWA, S., & KOCHI, M. (1939). Ueber ein neues serologisches Phänomen der Aktinomyzeten. I. Mitteilung. [**A New Serological Phenomenon of Actinomycetes. I**].—*Ibid.* 197–209. [In German].

I. By adding 0·2% convallamarin (Merck) to horse-liver broth under a vaseline seal it was found possible to grow a culture of *Actinomyces bovis* that was homogeneously turbid in the upper part of the tube. Subcultures of this turbid growth remained homogeneous in convallamarin medium. In horse-liver broth without convallamarin this was not the case; the normal auto-agglutinating growth occurred. Microscopically, the turbid growth differed from the normal growth at the bottom of the tube in that it stained as granular bodies, appeared coccoid by dark-ground illumination, and passed through Elford filters of 0·87μ and 0·66μ porosity.

II. Homogeneous suspension was prepared and one drop mixed with 0·5 ml. of dilutions of normal sera of various animals and with sera from human beings with actinomycosis. The suspension in the higher concentrations of serum was seen to dissolve, becoming clear and undetectable to the naked eye. This phenomenon extended to slightly higher dilutions of actinomycotic than of normal serum. The lysing effect of the serum was found to be reduced by heating the emulsion at 100°C. for 30 min., but heating serum did not appreciably diminish its lysing capacity.—D. L. ROBARTS.

PLUMMER, P. J. G. (1941). **Coccidioidomycosis with a Pathological Report of a Case in a Dog.**—*Canad. J. comp. Med.* **5.** 146–148.

A description of an infection in a dog with *Coccidioides immitis*. The condition of the lungs was suggestive of TB.; acid-fast bacilli were absent; the heart and spleen showed no change. A large olive-shaped lesion was encountered in the posterior ventral portion of the right cerebral hemisphere; it was moderately encapsuled and easily detached. Histopathologically the lung and the brain lesions were similar, heavy-walled spherules being observed in both tissues. As it had been considered at first that the brain condition was a glioma, no cultures had been made. It was concluded, however, from the absence of budding that the organism was not a yeast. It is suggested that, in TB.-like lesions in which neither tubercle bacilli nor the causative agent of blastomycosis can be found, this condition should be kept in mind.—R. GWATKIN.

MONOD, J. (1941). Sur un phénomène nouveau de croissance complexe dans les cultures bactériennes. **[A New Complex Growth Phenomenon in Bacterial Cultures]**.—*C. R. Acad. Sci., Paris.* **212.** 934–936.

When a micro-organism is grown in a synthetic medium containing a single sugar, the growth curve is of the classical S form. While this is also given in certain cases when a mixture of two sugars is used, in many cases the curve shows two distinct periods of growth, separated by a short phase during which growth is reduced, absent, or even reversed. The phenomenon is designated *attaque préférentielle*.—J. G. CARR.

DISEASES CAUSED BY PROTOZOAN PARASITES

REES, C. W., REARDON, L. V., & JACOBS, L. (1941). **The Cultivation of the Parasitic Protozoa without Bacteria.**—*Amer. J. trop. Med.* **21.** 695–716.

This valuable review of the subject is divided into two principal sections, one being concerned with isolation and the other with the elaboration of satisfactory culture media which will satisfy the nutrition, respiration, and other metabolic activities of the protozoa. As much of the present knowledge of the physiology of the protozoa has been obtained by cultivating free-living forms without bacteria, this aspect of the subject has been reviewed with special emphasis on the physiological requirements of *Entamoeba histolytica*. Isolation of protozoa from bacteria is not difficult and can be accomplished by methods concerned with differential reaction to geotropism and poisons, the migration of protozoa through semi-solid media, and micro-isolation. There are, however, complicating factors connected with bacteria-free protozoan cultivation. Bacteria often act upon foodstuffs in such a way that hydrolytic products, similar to those of the intestinal or other tracts parasitized by bacteria and protozoa, are produced in culture. Bacteria may also reduce oxygen tensions until a point is reached which is favourable to the growth of parasitic protozoa; they may also serve as food. All these favourable conditions which obtain in the presence of bacteria must be duplicated *in vitro* in their absence. Even under the most favourable conditions, cultivation naturally requires great adaptation by the protozoa. Isotonicity of the fluid part of the medium with that of the tract from which the protozoa were obtained is essential, as well as a balanced food supply and balanced reactions of various respiratory factors, vitamins, and catalysts. The best medium for general use is Dobell & Laidlaw's modification of BOECK & DRBOHLAV's medium (L.E.S. = Locke-egg-serum medium), which supplies, without bacteria, adequate nourishment for *Eutrichomastix colubrorum*, *Trichomonas foetus*, and *T. columbae*, flagellates which may be regarded as representative parasites of the digestive, urinogenital, and respiratory tracts. *E. histolytica* evidently requires other factors than those of the medium for its growth and these factors require further investigation.

—C. HORTON SMITH.

YAKIMOV, V. L. (1940). **[Correlation between Human and Porcine Amoebiasis]**.—*J. Microbiol., Moscou.* No. 6. pp. 65–68. [In Russian: French summary]. [Abst. from abst. in *Trop. Dis. Bull.* **38.** 595].

Y. found that large numbers of amoebae, considered to be *Entamoeba deblecki*, were present in sick pigs. He concluded from a review of available literature that the question of the relation between porcine and human amoebiasis is by no means settled. Several cases, however, of dysentery in human beings occurred, along with the disease in the pigs.

ZSCHUCKE, J. (1940). Ueber Kernhinterendformen bei westafrikanischen Stämmen von Trypanosoma gambiense. **[Forms with a Posterior Nucleus in West African Strains of *T. gambiense*]**.—*Z. Hyg. InfektKr.* **122.** 620–625.

Z. records that, during observations on human sleeping sickness in Fernando Po in 1938–40, he was able to detect posterior nuclear forms in inoculated mice and g. pigs in six out of ten strains of trypanosomes examined, although in 1928–29 he had failed to find such forms in strains of human trypanosomes from the same area. In the earlier observations the disease in natives had been chronic, only 20% of cases showing nervous symptoms or fever, and only 1 in 1,000 any swarming invasion of the peripheral blood, but in the later observations cases had shown high fever, intensive blood infestation, and a greater response to treatment with germanin than had the previous symptomless infections. It seems then that the present strains approach *T. rhodesiense* in their characteristics. During the last ten years a careful control of immigration has been in force to prevent the introduction of any new strains of trypanosomes, and it is suggested that the increased virulence is due to the introduction of susceptible Nigerian labour in place of the more resistant natives of the Cameroons and other areas who had acquired resistance by previous exposure.

It is claimed that the observations support the view that the appearance of posterior nuclear forms indicates an increased virulence, and that *T. rhodesiense* and *T. gambiense* are identical. [There appears to be no real guarantee that a new strain of trypanosome has not been imported, and therefore the possibility that the strains under observation were *T. rhodesiense* has not been excluded.]—U. F. RICHARDSON.

GASIĆ, G., & BERTÍN, V. (1939). Animales reservorios de virus de la tripanosomosis americana en Chile. (Communicación preliminar). **[Animal Reservoirs of *T. cruzi* in Chile. Preliminary Communication]**.—*Rev. chil. Hig. med. Prev.* **2.** 247–261.

The authors examined 46 dogs and 22 cats from the district of Domeyko. Thick blood films were made from 57 of these animals and 38 were examined by Brumpt's xenodiagnostic method [which consists in attempts to obtain infection in suitable vector insects, in this case reduviid bugs, by feeding them on the animal]. Of these animals 16 dogs and four cats were found to be infected with *T. cruzi*. It was found that thick blood films were quite satisfactory for diagnosis in young animals, but in older ones xenodiagnosis was more satisfactory.

—MILLER WATSON.

I. ABELEIN, R. (1941). Zur Krisis in der Beurteilung der Trichomonadenseuche des Rindes. **[On the Controversy as to the Importance of Trichomonad Infection in Cattle]**.—*Berl. Münch. tierärztl. Wschr.* May 30th. 261–265.

II. ABELEIN, R. (1941). Trichomonadenseuche beim Bullen und ihre Behandlung. **[Trichomoniasis in Bulls and its Treatment]**.—*Ibid.* July 25th. 357–362, and Aug. 1st. 370–377.

I. Since the measures recommended for the control of trichomonad abortion entail considerable interference with cattle breeding in the affected area, A. points out the necessity of a decision as to the pathogenicity of these protozoa. A review is given of the views of German authorities as to the pathogenicity of *T. foetus*, and the possibility of its being a secondary invader of sexual organs infected by the virus of vesicular vaginitis or by bacteria.

An experiment is recorded in which eight heifers

were infected by the intravaginal injection of a pure culture of the trichomonad after they had been served by bulls which had not previously covered cows. Of these heifers, four aborted within three months, two developed endometritis, one failed to conceive, and one calved normally. A control not inoculated with culture calved normally. A second experiment, of which the details are not yet published, is quoted as evidence that bulls can be infected by injection into the preputial sac of traces of pure *T. foetus* culture, and may remain carriers of the organism for long periods. The trichomonads can establish themselves in the preputial sac without the assistance of a virus, and in the absence of catarrh.

The possibility is discussed of the reinfection of cleaned herds by organisms leading a saprophytic existence or parasitic in other animals, but it is considered that the tri-flagellate *T. foetus* is a species distinct from the blood forms recorded by KÜST, and from the trichomonads of man and other animals which have four flagella. The power of the organism to survive outside the body, and the possibility of cyst formation are discussed, but even if action has to be taken to combat possible survival in these ways, it is not considered that the value of the recommended measures of control is affected.

II. The first part of this article deals with the distribution of trichomonads in the body of an infected bull, and the claims that they invade the urethra, the semen, and even the blood of infected animals. It is suggested that there is no evidence that trichomonads isolated from such situations were *T. foetus*, and that investigators putting forward such claims failed to differentiate between *T. foetus* with its three anterior flagella, and other species with four anterior flagella [but see also HEES—*V. B.* **12.** 270]. Specimens of blood, urine, and semen collected by A. from 128 infected bulls revealed trichomonads in only one case from the urine and semen, and to explain this infection it is suggested that the organisms may invade the urethra temporarily but do not establish themselves in that organ. There was indeed some doubt that the material collected might not have been contaminated with preputial secretion. In no case was a blood infection detected, even after intravenous inoculation of trichomonad cultures.

For detection of infection in bulls the microscopic examination of fresh preparations of preputial secretion is recommended, specimens being collected by passing a brush through a cannula into the preputial sac, and obtaining material from several situations, as the organisms tend to congregate and are not spread evenly through the sac. If the first examination is negative, a second is recommended after eight days. 281 bulls were examined, 134 being found positive at the first examination, and 12 at the second, whilst of the 110 bulls passed as free from disease, only three were implicated later in outbreaks, and they may have become infected after examination. Experimental infection of bulls with pure cultures of *T. foetus* only produced slight catarrh of the prepuce, and it is considered that when acute preputial inflammation occurs, other organisms are responsible.

The second part of the paper deals with the treatment of trichomonad infection in bulls. A description of the anatomical and histological structure of the preputial sac is given, and it is pointed out that in view of the folding of the mucous membrane and the presence of flask-like crypts, methods of irrigation with watery solutions, even when the preputial opening is ligatured so that the fluid is retained, are likely to be ineffective and to result in cure only in rare instances. A. recommends that the prepuce be treated with acriflavine ointment, the urethra being irrigated with acriflavine solution, in case some organisms have taken refuge there. This treatment can only be satisfactorily carried out if the bull is cast and anaesthetized, for which purpose A. uses a spinal anaesthetic. Difficulty is often experienced in drawing out the penis and everting the preputial sac, and for this an improvised suction pump is described.

With acriflavine ointment at a strength of over 0·5%, and urethral irrigation with acriflavine solution over 0·1%, some necrosis of the treated parts may occur, and out of 24 bulls treated, four had to be slaughtered. Out of 57 bulls treated with 0·5% ointment and 0·1% solution, 55 bulls were cured and two remained infected, whilst with weaker dilutions the proportion of failures increased.

Judgement as to the efficacy of treatment was made on the results of examinations of the preputial secretions made 14–21 days later, and on the records of the herds on which the bulls were introduced after recovery. It is pointed out that some of the apparent failures to respond to treatment may have been due to reinfection after return to service.

The reference list at the end of this article serves for both I and II.—U. F. RICHARDSON.

CARPANO, M. (1939). Le infezione da "Aegyptianella pullorum" nei gallinacei e nei palmipedi in Albania. [*A. pullorum* **Infection of Poultry in Albania**].—*Riv. milit. Med. vet. Roma.* **2.** 423–436.

In Albania the distribution of this infection in poultry is not well known, as its presence is often obscured by the more serious spirochaetosis, and because it occurs in local birds as a latent infection, causing mortality only in imported fowls. Infection has been detected in fowls, ducks, and geese.

The parasites are described as occurring in the red blood corpuscles in the form of small rings and anaplasmoid forms which later increase in size and become vesicular. The shape usually remains rounded, but in smears, half-moon forms are sometimes encountered particularly near the edges of the corpuscles. As the parasite reaches maturity, the chromatin breaks up and becomes disposed in granular masses round the periphery of the parasite, producing rosette forms. As in the case of other piroplasms the number of parasites in the peripheral blood varies considerably, from great rarity to a corpuscular infection rate of 95%.

Clinically the disease resulting from infection may be acute or chronic, the acute form being characterized by anorexia, diarrhoea, and rapid death, and the chronic form by digestive disturbance, diarrhoea, jaundice, and paralysis. The lesions are not sufficiently characteristic to be diagnostic, and diagnosis must be based on blood examination, it being remembered that other diseases may cause a reappearance of the parasites in the blood of carrier birds.

Prophylactic measures should be directed to destruction of the vector, *Argas persicus*, and for treatment trypanblue is recommended (1 ml. of a 1% solution per kg. body weight). This does not clear the peripheral blood of parasites, but it does lead to a rapid improvement in general condition.—U. F. RICHARDSON.

PRATT, I. (1941). **The Effect of** *Eimeria tenella* **(Coccidia) Upon the Glycogen Stores of the Chicken.** —*Amer. J. Hyg.* Sect. C. **34.** 54–61.

Earlier work by P. [*V. B.* **11.** 757.] showed that the blood sugar of the chicken was markedly increased during the acute stages of caecal coccidiosis. As this increase occurred when the birds were feeding continuously, as well as when they were starved for 19

hours, the problem arose as to the source of this additional supply. P. advances the theory that caecal haemorrhage during acute coccidiosis sets up a demand for fluids to maintain the volume of the blood and these, obtained from the tissues, carry away large quantities of lactic acid or some other substance which is reconverted into glycogen by the liver, thus accounting for observed losses in muscle glycogen, high blood sugar, and the considerable variation in amounts of glycogen in the livers of birds starved for 19 hours during acute coccidiosis. These observations would seem to indicate that the source of the large amounts of blood sugar during acute caecal coccidiosis may be the muscle glycogen stores.—C. HORTON SMITH.

WALLER, E. F., & MORGAN, B. B. (1941). **The Pathology of *Eimeria leporis* (Coccidia) in the Cottontail Rabbit.**—*Amer. J. Hyg.* Sect. C. **34.** 83–85.

Gross lesions associated with *E. leporis* were found in the vermiform appendix and in the vicinity of the ileo-caecal valve. The lesions were haemorrhagic raised areas of variable size and sections showed them to be coccidia-infected villi. Asexual and early sexual phases of the parasite were situated in the epithelial cells at the base of the crypts and macro- and microgametocytes and oocysts occurred at the tips of the villi. No parasitism of the submucosa was observed. Scrapings and sections of the mucosa revealed multiple parasitism of individual cells in all instances.—C. HORTON SMITH.

BECKMAN, H. (1941). **Atabrine Retardation of Schizogony in *Plasmodium cathemerium* Infection in Canaries.** —*Amer. J. trop. Med.* **21.** 795–801.

B. reports the results of a preliminary investigation, in which he used the retarding effect of atebrin on the rate of growth of erythrocytic asexual stages of *P. cathemerium* in canaries in an attempt to establish a quantitative index of the drug's efficiency which would furnish a useful criterion for comparing its value with that of the antimalarial drugs. By employing a standard dose of atebrin (0·1 mg. per 16 g. body weight) B. succeeded in obtaining a quantitatively estimable effect upon the growth rate of trophozoites, and he considers that after study of higher and lower dosages this effect may be found to be a reliable index of the drug's efficiency.

—C. HORTON SMITH.

WOLFSON, F. (1941). **Mammalian Toxoplasma in Erythrocytes of Canaries, Ducks, and Duck Embryos.** —*Amer. J. trop. Med.* **21.** 653–658.

In the course of studying the life-cycle [which is still unknown] of a mammalian toxoplasm, W. transmitted it to canaries, ducks, and duck embryos and found it to infect erythrocytes. This is the first report of such an occurrence. As previous workers have frequently transmitted mammalian toxoplasms to birds without any observable infection of the avian erythrocytes, the present strain must either differ from all the strains so far described or exhibit a behaviour in the present avian hosts which differs from that observed in any of the avian hosts so far used. This new strain, to which the human strain produced cross-immunity, was studied in more than 20 ducks and 50 canaries. In the case of egg embryos, both avian and mammalian blood proved infective and caused development of typical lesions on the chorio-allantoic membranes.—C. HORTON SMITH.

I. SEMSKOW, M. W. (1941). Die Aetiologie, klinische Formen und die Epizootologie des Ikterus infectiosus der Rinder. **[The Cause, Clinical Forms, and Epizoology of Infectious Icterus in Cattle].**—*Z. Veterinärk.* **53.** 7–23.

II. AWROROW, A. A. (1941). Einige Ergebnisse der Erforschung der pathologischen Anatomie und Pathogenese des Ikterus infectiosus der Rinder. **[Research on the Pathology and Pathogenesis of Infectious Icterus of Cattle].**—*Ibid.* 32–40.

I. Infectious icterus (icterohaemoglobinuria) of cattle was described in the U.S.S.R. in 1935 and was later differentiated from piroplasmosis with which it had at first been confused. During the past five years, S. and his co-workers have carried out an intensive study of the disease and isolated a leptospira which they consider to be the causal organism. This organism, which they term *L. icterohaemoglobinuriae*, was isolated from natural cases of the disease in cattle and was pathogenic for four calves and a lamb by intravenous, intraperitoneal, or subcutaneous injection. The organism was without effect on g. pigs and rabbits, even after several passages. Further work is necessary on the pathogenicity for other species.

The sera of 34 cattle which recovered from the natural disease were examined serologically and 29 showed agglutinins and lysins to the leptospira. During 1939 the sera of 90 recovered cattle were tested by a micro-agglutination method against the spirochaete causing infectious icterus in man and a positive result was obtained in 74 (titres of 1 : 10–1 : 1,000,000). This suggests a close serological relationship between the organisms causing the human and bovine diseases.

Four types of the disease are recognizable clinically. An acute form which affects calves from two weeks to three months old and occasionally adult cattle, is characterized by haemoglobinuria, icterus, and pyrexia, and is almost always fatal within 2–3 days. A subacute form is similar to the acute but lasts 5–9 days and has a mortality rate of up to 50%. The so-called "rudimentary" form is characterized by red urine as the only obvious symptom and affects both calves and adult animals. This form is easily overlooked and recovery is usual. Bilirubin is present in the blood plasma but in amounts insufficient to produce obvious icterus. Finally, there is an extremely mild form in which the amount of haemoglobin in the urine is not recognizable clinically, but there is a demonstrable excess of bilirubin in the blood plasma. This condition usually lasts 2–10 days and is associated with a slight disturbance of general health and a drop in milk yield.

The disease is found mainly in southern Russia and the organism is probably present in the water in swampy areas, although it has not so far been isolated from this source. Agglutinins have been demonstrated in rats but the latter have not been shown to excrete the leptospira in the urine. Cases of the disease are commonest between May and August.

Details of the urinary findings in naturally and artificially infected cattle are given in tabular form and there are a number of references to the disease in Russian journals.

II. This is a detailed account of the pathology and pathogenesis of infectious icterus of cattle derived from a study by A.'s colleague at Voronesh of the natural and experimental cases referred to in I. The material comprised 40 natural cases and four experimentally infected calves. Spirochaetes were demonstrated in histological sections of liver, kidney, lung, heart, and various lymph nodes, especially the mesenteric.

Macroscopic changes in the acute and subacute forms of the disease included intense icterus, necrotic areas in the mucosa of the tongue, gums, and muzzle and in the skin in various situations, especially around the eyes. The liver was swollen and friable, the kidneys were dark reddish-brown and usually showed haemorrhages, and the bladder was greatly distended with dark cherry-red urine. The lymph nodes were swollen and when cut exuded a yellowish fluid and sometimes showed haemorrhages. The lungs were oedematous and often showed

subpleural haemorrhages. The myocardium was pale, flabby and friable. There was often a catarrhal gastro-enteritis. The subcutaneous and subserous connective tissues were always very oedematous and the gall bladder was distended.

Histological sections of the liver showed foci of necrobiosis, mainly related to the central parts of the lobules; the interlobular connective tissue was infiltrated with focal and diffuse collections of round cells. The kidney and heart muscle showed degenerative changes.

It is suggested that the icterus in the early stages is mainly haemolytic but later is in part due to liver damage (hepatogenous, toxic). Death is due to asphyxia resulting from extensive haemolysis and pulmonary oedema or to paralysis of the central nervous system or to heart damage caused by degenerative changes in these tissues.

The lesions in the four experimentally infected calves were similar to those present in natural cases.—E. G. W.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

*WAGENER, G. (1941). Beitrag zur Epizootologie der Maul- und Klauenseuche. [**Epizoology of Foot and Mouth Disease**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 343].

The dissertation is a collection of meteorological records made during an outbreak of F. & M. disease and purporting to show that rapid changes in temperature have an influence on the speed of spread [whether a quickening or a slowing effect is not made clear in the abstract.]

*BOMS, P. (1940). Die Trennung des Vakzinevirus vom Virus der Maul- und Klauenseuche durch Züchtung. [**Separation of Vaccine Virus from Foot and Mouth Disease Virus by Culture**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 77].

Pox virus can be easily cultivated in tissue cultures prepared from many different animal species, but F. & M. disease virus only on "particular tissue cultures". Pox virus also grows on the chorio-allantois of fowl embryos, but F. & M. disease virus dies out quickly on this. This method can therefore be used to obtain pure pox virus from a mixture of both viruses.

*SCHMIDT, F. (1940). Weitere kasuistische Beiträge zur Frage des Schafzusammenhanges bei der Uebertragung des bösartigen Katarrhalfiebers des Rindes. [**Experiences on the Connexion between Sheep and the Spread of Bovine Malignant Catarrh**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* August 1st. 377. (1941)].

S. visited 56 localities in Germany where cases of bovine malignant catarrh had occurred and obtained evidence that sheep played a part in transmission. He was unable to throw any new light on the nature and cause of the disease.

I. CILLI, V. (1939). Saggi di patogenicità e di vaccinazione negli equini con virus neurotropo della peste. [**Investigations into the Pathogenicity of Neurotropic Horse-Sickness Virus and the Vaccination of Equines**].—*Riv. milit. Med. vet., Roma.* **2.** 114–120.

II. MAZZOLETTI, C. (1939). Illustrazione di casi di peste equina (campagna Italo-Etiopica 1935–1936). [**Cases of African Horse Sickness during the Italo-Abyssinian War**].—*Ibid.* 366–373.

I. C., in earlier work on the neurotropic virus of horse sickness in Eritrea, had found that the attenuation of the virus was much more rapid and regular when passaged through g. pigs than when passaged through mice, and that after the 15th passage it had lost its pathogenicity for mules although it was still capable of killing horses. Investigations are now recorded on the pathogenicity and protective values of strains after 97–103 passages through the brains of g. pigs. The two strains of virus, after this number of cerebral passages, were found to be no longer fatal to either mules or horses, though some clinical symptoms of horse sickness might develop after vaccination carried out as follows:—horses and mules were given an injection of 10 ml. of a 1 : 100 dilution of brain emulsion of one strain, followed a week later by a similar dose of the second strain, and after another week by the inoculation of a mixture of the two strains. Nine vaccinated mules and one horse were exposed to infection in the field with five unvaccinated mules and three unvaccinated horses as controls. Of the vaccinated animals, two mules developed symptoms of horse sickness and recovered, and one mule died. Of the controls two mules and two horses died and one mule developed symptoms of infection but recovered. After 178 days the animals were inoculated with blood from an infected animal. A mild reaction with recovery resulted in the mules, but the horse developed fatal horse sickness.

II. M. describes and illustrates cases of horse sickness occurring in mules during the Abyssinian war, during which both the cardiac and pulmonary forms of the disease were encountered.—U. F. RICHARDSON.

MORGAN, I. M., & LAVIN, G. I. (1941). **Immunizing Capacity of Virus of Eastern Equine Encephalomyelitis Inactivated by Ultraviolet Light.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 497–499.

Eastern E.E. virus cultivated in chick embryos was inactivated by irradiation for 15–25 min. with an ultraviolet lamp operating at 30 milliamps. and 15,000 volts. The immunizing capacity of the irradiated virus was compared with that of a formalin-inactivated virus, and no difference could be detected in the degree of immunity produced. The antigenicity of the virus diminished rapidly with further irradiation.

CASÓS, G. A. (1941). Encefalomielitis de los equinos o meningitis cerebroespinal. ("Locura de los caballos"). [**Equine Encephalomyelitis in the Argentine**].—*Bol. Fom. Ganad., B. Aires.* **6.** No. 27. 1–7.

This is a résumé of present knowledge of E.E. in the Argentine for the instruction of stock owners. The disease takes two forms, "excited" and "dull", which resemble the Eastern and Western forms respectively, as seen in the U.S.A. In the "dull" form the lesions are mainly confined to the spinal cord.—M. W.

*IONESCU, D. (1940). Turbariea in România. [**Rabies in Rumania**].—*Rev. Igiena soc.* **10.** 97–102. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Oct. 31st. 532. (1941)].

From 1929–38, 68,045 persons in Rumania were vaccinated after suspected infection, 24,000 being vaccinated in 1938. In the last four years the number of rabid dogs had risen to 9,157. In 92% of all cases in man, dogs were involved, 35% being stray dogs; cats were involved in 6%.

The increase in rabies in Rumania caused the three vaccine institutes at Bucarest, Jassy, and Cluj to open 39 branch offices throughout the country. The control of dogs is the pressing need.

*PUGACH, E. (1939). **[The Influence of Freezing on Virulence and Immunizing Properties of the Anti-rabies Vaccine].**—*Z. Mikrobiol.* No. 2/3. pp. 59–63. [In Russian: English summary]. [Abst. from abst. in *Jber. Vet.-Med.* **66.** 220].

Live virus could still be demonstrated for 16 days after it had been frozen 1–3 times in the form of Fermi's (1%) phenol vaccine and for 20 days after freezing for 24 hours. In vaccine containing 0·5% phenol the virus remained alive for 17 days after five days' freezing. In comparison with control vaccine [presumably not frozen] the immunizing power of 1% phenol vaccine was similar and that of 0·5% phenol vaccine was definitely decreased. Repeated freezing and thawing is very injurious to the virus. It is therefore concluded that rabies vaccine must be protected against frost when in postal transit.

TENBROECK, C. (1941). **Cultivation of the Hog Cholera Virus.**—*J. exp. Med.* **74.** 427–432.

T. has confirmed and extended considerably the work of HECKE [*V. B.* **7.** 528,] on the cultivation of the virus of swine fever. The virus was grown in the presence of fresh minced swine testicle in Tyrode solution, in flasks, on the chorio-allantoic membrane of ten-day chick embryos, and on the surface of swine serum agar. In flasks it was grown for 14 transfers. It was also grown in eggs for 13 transfers followed by 13 transfers on agar (*i.e.* 26 transfers in all). Each transfer entailed a dilution of at least 1 : 10. The same strain of virus was used throughout and swine testicle was always used. No evidence of a contaminating virus which might have assisted cultivation was obtained.

Typical swine fever neutralizable by commercial S.F. serum, was produced by the cultured virus and no evidence of attenuation was apparent, as the last culture was infective at 1 ml. of 10^{-6}. No evidence of adaptation to the egg was obtained; passage in eggs without swine tissue on the chorio-allantoic membrane or intravenously resulted in loss of the virus after two transfers.

Most of the cultures were infective at high dilution and four, which contained a little over 0·5 mg. of protein nitrogen, produced typical S.F. at 1 ml. of 10^{-6}, whilst one was active at 10^{-7}. One titration with the serum of an acutely affected pig gave a titre of 10^{-5}.

Whilst all methods produced highly active cultures, larger yields of virus were obtained with less labour by the serum-agar method than by the other.—A. W. S.

SCIUTI, M. (1936). La meningite benigna dei guardiani di maiali. **[Swineherds' Disease].**—*Rinasc. med.* **13.** 183–184.

A brief resumé of present knowledge of the symptoms, aetiology, diagnosis, and treatment of this disease.

LEVI, M. (1938). La malattia dei giovani porcari. **[Swineherds' Disease].**—*G. Clin. med.* **19.** 576–582.

A case is reported, with special reference to diagnosis, in a swineherd in the province of Florence. The aetiology of the disease is discussed, and it is suggested that the infection is more widespread than the case reports indicate.

*TÓTH, A. (1941). **[Research on Sheep Pox].**—*Közl. Összehas. élet- es kórtan Köreből.* **29.** 139. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 260].

A description of experiments on sheep showing that sheep pox and vaccinia viruses are immunologically distinct. They are also differentiated by the infection syndrome they cause: vaccinia causes blister-like lesions lasting for 12 days or less, whilst sheep pox virus causes nodular lesions lasting for 20 days or more.

FRANCIS, T., Jr. (1941). **The Significance of Nasal Factors in Epidemic Influenza.**—*Problems and Trends in Virus Research.* pp. 41–54. Philadelphia: University of Pennsylvania Press.

In discussing the mechanism underlying the immunity to influenza, F. discloses two types of resistance of the nasal mucous membrane. The first, studied in ferrets [see FRANCIS, T., Jr., & STUART-HARRIS, C. H.—*V. B.* **9.** 472.], is related to the change in structure of the respiratory epithelium in which the action of the virus results in the appearance of an abnormal primitive epithelium which is highly resistant to reinfection. The immune mechanism which is implicated is purely cellular in nature.

It has also been shown that nasal secretions of many immune human subjects possess the power of inactivating the virus. The agent in these secretions shows all the properties of serum antibodies and there is some apparent relation between circulating antibodies and the inactivating effect of these secretions.—R. E. G.

EDWARD, D. G. ff. (1941). **Resistance of Influenza Virus to Drying and its Demonstration on Dust.**—*Lancet.* **241.** 664–666.

Preliminary experiments showed that influenza A virus is markedly resistant to drying. Dust particles, shaken from a blanket impregnated with virus, and recovered from the air by the Wells centrifuge were infective for mice: in addition, virus was found in dust exposed in various parts of a cubicle containing an infected ferret, provided the samples were within reach of direct droplet projectiles.

Further experiments with virus deposited on serge, cotton sheet, dust, and glass slides showed survival of 0·01–10% of the virus, depending on the rate of desiccation and the humidity of the atmosphere. In the dry condition the loss in infectivity was very slow and small numbers of infected particles were still detectable for at least 14 days. The influence of light and atmosphere on the disappearance of virus is discussed.—R. E. G.

SHAFFER, J. G. (1941). **Antigenic Relationship of Infectious Myxoma and Fibroma Viruses of the Rabbit.**—*Amer. J. Hyg.* Sect. B. **34.** 102–120. [Author's summary copied *verbatim*].

1. Specific complement-fixing antibodies were demonstrated in sera of rabbits against the myxoma and fibroma viruses:

(a) after injection of heat-inactivated virus suspensions;

(b) after recovery from actual infection with the diseases. Cross fixation reactions were obtained in all cases, indicating a close relationship between the virus antigens.

2. The presence of soluble, closely-related, heat-labile, complement-fixing bodies in myxoma and fibroma virus suspensions was demonstrated. A heat-stable complement-fixing fraction was also noted in the unfiltered viral suspensions.

3. Lack of complete identity between any of the antigenic components present in myxoma and fibroma virus suspensions is indicated because of the stronger reactions recorded when an antigen was used against its homologous antiserum.

4. A comparison was made between antigen-production through injection of heat-inactivated myxoma and fibroma virus suspensions, virus-free filtrates and the active viruses.

5. The development of complement-fixing antibodies against myxoma and fibroma viruses in the sera of fibroma and fibroma-myxoma-inoculated animals was studied. The evidence indicates that the presence of measurable fixing bodies versus myxoma virus in the serum is not necessary for immunity to myxoma.

6. The myxoma virus remained unchanged through a series of 43 egg passages, as shown by its ability to bring about death in normal rabbits and its unaltered power to fix complement in the presence of a myxoma-immune serum.

7. Fibroma virus failed to multiply on the egg membrane, although remaining viable for 16 to 20 days.

DE CASTRO TEIXEIRA, J., & SMADEL, J. E. (1941). **Further Studies on the Serological Reactions of the Soluble Antigens of Infectious Myxomatosis.**—*J. Bact.* **42.** 591–603. [Authors' summary copied *verbatim*].

Elementary bodies and specific soluble antigens can be obtained from the chorioallantoic membranes of developing chick embryos infected with the virus of infectious myxomatosis.

The A and B soluble antigens of myxoma which lose their specific precipitability on heating retain their power to fix complement in the presence of specific antibody.

Collodion particles coated with heated A antigen are flocculated by anti-soluble-substance serum.

EISENBERG-MERLING, K. B. (1941). **Microscopical Observations on the Bacteriophage of the Staphylococcus.**—*J. Path. Bact.* **53.** 385–390.

By the use of a technique briefly described in this communication, the author observed the action of the staphylococcus bacteriophage in hanging drop preparations. Lysis commences with swelling of the coccus when 1–4 bright spots can be detected adherent to the cell membrane. After the initial swelling the coccus is reduced in size and density, and phage bodies can be seen within it. The process is generally completed in two hours, the coccus slowly disintegrating and releasing the phage bodies. Never more than four phage bodies take part in the lysis of a single staphylococcus, as compared with 150–350 involved in the lysis of *Bacterium coli*. The size of the staphylococcus phage has been determined as $0{\cdot}06\mu \pm 10\%$. Cocci resistant to the action of the phage were found in some of the preparations.—K. C. SELLERS.

IMMUNITY

PILLEMER, L., & ECKER, E. E. (1941). **The Terminology of the Components of Complement.**—*Science.* **94.** 437.

It is well known that complement is composed of four functionally distinct components known as the "mid-piece" (globulin fraction), "end-piece" (so-called "albumin fraction"), and two thermostable fractions, "third component" and "fourth component" [see also *V. B.* **11.** 613]. During studies on the separation and characterization of these components, electrophoretic diagrams were obtained which indicated that mid-piece contains at least four distinct proteins as also does end-piece; one of the proteins present in end-piece appeared to be γ-globulin. No significant difference was detected electrophoretically between normal serum and serum deprived of its fourth component, while serum lacking in third component showed a disturbance of the α-globulins. From these results it is evident that the terms "mid-piece", "end-piece", "albumin fraction", "globulin fraction" are misleading and it is suggested that the four components of complement be designated by the following symbols :–C′1=mid-piece, C′2=end-piece, C′3=third component, and C′4=fourth component.—R. ALLCROFT.

HEIDELBERGER, M. (1941). **Quantitative Chemical Studies on Complement or Alexin. I. A Method.**—*J. exp. Med.* **73.** 681–694.

HEIDELBERGER, M., WEIL, A. J., & RREFFERS, H. P. (1941). **Quantitative Chemical Studies on Complement or Alexin. II. The Interrelation of Component with Antigen-Antibody Compounds and with Sensitized Red Cells.**—*Ibid.* 695–709.

HEIDELBERGER, M., ROCHA E SILVA, M., & MAYER, M. (1941). **Quantitative Chemical Studies on Complement or Alexin. III. Uptake of Complement Nitrogen under Varying Experimental Conditions.**—*Ibid.* **74.** 359–367.

I. Quantitative determinations of the difference between the amounts of specifically precipitable nitrogen found in the presence of active complement on the one hand, and of inactivated complement on the other, were made as a measure (in mg. of nitrogen per ml.) of the combining component or components of complement with varying proportions of antigen and rabbit antisera, which were chosen so that not quite all the antibody was precipitated. Specific precipitates had to be used in amounts capable of combining with the volume units of complement present in the filtrates through gradocol membranes of relatively large volumes of g. pig serum, so that a weight unit for complement could be established with accuracy. Analyses were also made in triplicate as an additional precaution to ensure the utmost accuracy; the neutralized and inactivated rabbit antisera used were of high antibody content so that analyses could be made at dilutions which were not anticomplementary. Experiments were made to eliminate the possibility of nitrogenous components of g. pig serum unrelated to complement causing the increase in the nitrogen precipitate. Data are given showing the range of accuracy and reproducibility of the new method which, although too laborious for widespread routine use, should serve as a useful tool for research and for the establishment of reference standards.

II. The values for complement obtained in the previous paper were employed in a study of the relation between complement, haemolysin, and red blood cells and between complement, antigen, and antibody, antigen and antibody solutions of known content being used. In several experiments, the actual quantities of antigen, antibody, and complement were calculated in weight units for each significant dilution and mixture, together with the amount of haemolysin and the number of r.b.c. in the haemolytic system. The data estimated on the basis of these new, quantitative, absolute methods of analysis were shown to correspond with the theory of combination of multivalent antigen with multivalent antibody, upon which basis the fixation of complement by antigen-antibody union could be qualitatively and quantitatively accounted for.

III. Quantitative data on the effect of variations in the time of contact and in the proportions of the reacting proteins on the amount of specifically precipitable nitrogen found in active g. pig serum were found to confirm the validity of the method for the estimation of complement-combining component in weight units and to extend the experimental basis for its use. The quantity of specifically precipitable nitrogen remained constant, whether determined with solutions containing excess of antigen or of antibody. Specific antigen-antibody precipitates, freshly formed in the presence of antibody excess and re-suspended in finely divided form after washing, were shown to be almost as efficient in

the fixation of complement from subsequently added g. pig serum as the corresponding amounts of antigen and antibody added separately and producing specific precipitates in the presence of complement.—R. O. M.

KELSER, R. A. (1940). **Hypersensitiveness or Allergy.** —*Vet. Bull. U.S. Army.* **34.** 219–225.

In discussing the induction of hypersensitiveness, K. points out that when vaccines prepared from embryonic tissues are being used, fresh suspensions are less likely to produce severe reactions than old vaccine. He suggests that alterations in pH accompanied by autolysis or chemical changes may render such tissue vaccines more antigenic in respect of sensitization to subsequent doses. Sudden shock occasioned by homologous serum is also considered as an explanation of the phenomenon. —R. E. GLOVER.

CHASE, M. W. (1941). **Inheritance in Guinea-Pigs of the Susceptibility to Skin Sensitization with Simple Chemical Compounds.**—*J. exp. Med.* **73.** 711–726.

Breeding experiments, controlled so as to exclude the influence of feeding and seasonal factors, were made with two colonies of g. pigs which differed significantly in the degree of sensitivity attained to 2 : 4 dinitrochlorobenzene (proved to be a very suitable substance for research on drug allergy of the contact dermatitis type) after the same procedure of sensitization. The differences which became established between the two colonies, striking in that one strain gave in most cases uniformly intense reactions after a brief course of intracutaneous injections, while the other responded almost regularly to an even greater number of injections with only a low grade sensitivity, provided direct evidence that this type of sensitization was influenced by heredity. Successive sensitization to dinitrochlorobenzene and to poison ivy suggested that there was roughly an accordance between the sensitivities developed to these two substances. The experiments were not carried far enough, and at the stage which they had reached the results were too complicated, to permit a genetic analysis.—R. O. MUIR.

KINSELL, L. W., KOPELOFF, L. M., ZWEMER, R. L., & KOPELOFF, N. (1941). **Blood Constituents during Anaphylactic Shock in the Monkey.**—*J. Immunol.* **42.** 35–50.

By means of injections of fresh egg-white in physiological saline, anaphylactic shock of varying degree was produced in eight monkeys (four of which died in acute shock) and the blood was examined for chemical and cytological changes. Control experiments were carried out on normal monkeys, on monkeys which had been sensitized with egg-white without shock, and on monkeys in shock produced by histamine injections.

A significant drop in blood platelets was a constant finding in anaphylactic shock. This did not occur in the non-sensitized controls nor in the animals sensitized with histamine, but was noted to a slight extent and irregularly in sensitized animals showing no clinical shock.

A profound leucopenia, essentially a granulopenia, with a secondary leucocytosis was also a constant finding in anaphylactic shock and similar changes were found in some animals with no clinical symptoms of shock. A significant rise in the potassium of the plasma was found in the animals with severe shock. The results are discussed with reference to the hypothesis that anaphylaxis is due to the action of histamine.—F. A.

PARASITES IN RELATION TO DISEASE [GENERAL]

HASSALL, A., DOSS, M. A., TAYLOR, R. M., CARSON, G. B., & SEGAL, D. B. (1941). **Index-Catalogue of Medical and Veterinary Zoology. Part 5. Authors : E to Fynney.** pp. 1177–1458. Washington, D.C. : Superintendent of Documents. [8vo] [45 cents]. [For previous parts, see *V. B.* **12.** 65].

This latest part of the revised catalogue gives such well known workers as EHRLICH, HAMILTON FAIRLEY, and E. C. FAUST, and includes a considerable number of 1940 references.—E. S.

*MIKAČIĆ, D. (1941). Parasitska fauna naseg goveda. [**Parasites of Cattle in Yugoslavia**].—*Vet. Arhiv.* **11.** 28–50. [French summary]. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Oct. 3rd. 484. (1941)].

Twenty-five cattle were examined in detail, and the findings were supplemented by examination of the eyes, oesophagus, lungs, lymph nodes, etc. of a further 50–100 animals. Liver flukes, stomach worms, and, in calves, ascarids [*A. vitulorum*] produced the most harmful effects. Other parasites found included *Thelazia rhodesi* in the conjunctival sac in 30% of the animals, *T. gulosa* in 1%, *Gongylonema pulchrum* in the oesophagus in 22%, *Onchocerca* sp. in the ligamentum nuchae, and other nematodes. Among the parasitic protozoa are mentioned only *Babesia bovis*, *Sarcocystis blanchardi*, *Trypanosoma theileri*, and the small coccidia, *Eimeria zürnii* and *E. smithi*. The most harmful ectoparasites observed were the ticks, of which six genera were represented, and the midges; in one district of Croatia the type form of *Simulium reptans* (L.) could be identified.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

NICHOLLS, L. (1939). **The Relation of Tsetse-Fly Control to Forestry.**—*For. Abstr.* **1.** 63–69.

It is startling to read " It is true that in the past tsetse flies have performed an invaluable service, saving great areas of country from becoming peopled . . .", but it illustrates a point of view which might be more readily accepted by a forestry expert than by a veterinarian, and reveals the particular interest of this article, which largely reviews the work of SWYNNERTON and NASH from the forestry aspect.

Considerable detail is given as to suitable plantings for thicket formation more particularly as tsetse barriers, and those interested in this should consult the original article. It is pointed out that the value of thicket formation in tsetse control may vary with climatic conditions, and NASH is quoted as claiming that a large-scale policy of densification of woodland would be favourable to tsetse flies in Northern Nigeria as the thickets would protect the flies against desiccation during the six months of the dry season.—U. F. RICHARDSON.

ROBERTS, F. H. S. (1940). **A Survey of the Ectoparasites of Dogs in Brisbane, Queensland.**—*Proc. roy. Soc. Qd.* **51.** 147–149.

The survey included house dogs, dogs used in saleyards and abattoirs, and dogs kept for catching rats. Each dog

examined was dusted with derris powder and afterwards combed over a sheet of paper. The parasites which were collected on the paper were then identified. Five species of fleas were collected, *Ctenocephalus canis*, *C. felis*, *Pulex irritans*, *Ceratophyllus fasciatus*, and *Pygiopsylla congrua*. *C. felis* was commonest and is the prevalent flea in infestations of buildings in Brisbane. *P. congrua* is normally a parasite of the water rat (*Hydromys chrysogaster*). *Echidnophaga myrmecobii* has been found on dogs in other parts of Queensland.

Three species of lice were found, namely *Trichodectes canis*, *Linognathus setosus*, and the kangaroo louse, *Heterodoxus longitarsus*. Of the four species of ticks recorded from dogs in Queensland (*Ixodes holocyclus*, *Boophilus australis*, *Rhipicephalus sanguineus*, and *Amblyomma triguttatum*), only *R. sanguineus* was found. A check list of ectoparasites of dogs in Queensland is given which, in addition to the species named above, includes *Sarcoptes scabiei canis*, *Otodectes cynotis*, *Demodex canis*, *Trombicula hirsti*, and *Leewenhoekia australiensis*.—H. McL. Gordon.

Paramonov, S. Y. (1940). **[Flies of the Genus *Gastrophilus* and their Control]**.—pp. 128. Kiev: Akad. Nauk URSU. [8vo] [6 krb.] [In Ukrainian]. [Abst. in *Rev. appl. Ent.* Ser. B. **29.** 188, slightly amended].

A brief survey of the history of the study of *Gastrophilus* spp. and of present knowledge of their bionomics is followed by notes on the characters differentiating the larvae and adults from those of other Diptera, the geographical distribution of the genus, and the biology and morphology of the adults. A list is given of the known species, showing synonymy and the principal references to them in the literature. The adults of the nine species that (with one possible exception) occur in the Soviet Union, and the eggs and three larval instars of some of them, are described, and keys to them are included, together with records of their distribution and hosts (horses, donkeys, or wild horses) if known. The conditions essential for the hatching of the eggs are discussed, as well as the biology of the larvae and pupae in general and of the larvae of *G. inermis*, *G. pecorum*, and *G. meridionalis* in particular, followed by notes on the artificial breeding of the larvae and their economic importance as pests of horses. Instances observed in the Soviet Union of cutaneous myiasis in man caused by the larvae and of their occurrence in the human stomach are cited. Control measures are reviewed, and a short bibliography of the chief Russian and other literature is appended.

Enigk, K. (1941). Das Streifensommerekzem der Pferde. **[Summer Eczema in Horses]**.—*Dtsch. tierärztl. Wschr.* **49.** 57–60.

E. investigated this condition in German army horses in France during June-August, 1940. It was found to be due to the larvae of *Gastrophilus inermis* and occurred as a dermatitis in the cheek region. Crusts formed and streaks appeared which began under the eyes and in the middle of the masseter region and ran towards the angle of the mouth. Oedema often occurred in the cheeks and the throat lymph nodes were often swollen. Treatment of the condition is not necessary as the dermatitis heals spontaneously. The usual control methods are discussed.—A. L. Wilson.

Gebauer, O. (1940). Beobachtungen und Betrachtungen zum Jahreszyklus der beiden Dasselfliegen des Rindes. **[Observations on the Yearly Cycle of the Two Ox-Warble Flies]**.—*Z. InfektKr. Haustiere.* **56.** 207–228.

G. examined the spinal canal in numerous slaughter stock at various abattoirs and confirmed that the larvae of *Hypoderma bovis* are to be found in the epidural fatty tissue, mostly in the lumbar and sacral regions, a few being found in the thoracic and exceptionally in the cervical regions. Forming the theory that the larvae reach this site by migration up the nerve trunks, he examined calves killed 40, 60, and 110 days after exposure to egg-laying *H. bovis* and also four calves killed for other reasons. In no case could larvae be found. It is known that larvae appear in the spinal canal from November onwards when they are already 8–12 mm. long. Another calf, slaughtered in November, showed greenish tracks in the fatty epineural tissue along all the main nerve trunks leading to the spinal canal in which more than 20 larvae were found. Two larvae were found at the head of such tracks lying just ahead of a small abscess in each case. One of these was 4·5 mm. and the other 12 mm. long. Sections showed the greenish tracks to be inflammatory zones chiefly marked by eosinophile infiltration; the nerves themselves were unaffected. These findings were confirmed in a second calf and G. concludes that the larvae of *H. bovis* normally penetrate the skin and travel by way of the epineural tissue up the nerve trunks to reach the epidural tissue.

Examinations of the eosophagus in 321 slaughtered cattle showed 152 to be infested with about 970 larvae of *H. lineatum*. First-stage larvae were found in the submucosa of the oesophagus, more usually in the thoracic and abdominal portions. Most larvae were orientated along the oesophagus but some pointed forwards and some backwards. In about 90% of cases there was oedema of the submucosa, although the mucous membrane itself was unaffected. The oedema fluid was reddish and rich in eosinophiles. It had usually disappeared by the month of May. The larvae were usually found to have migrated out of the oedematous zone. In a few cases no macroscopical changes were evident although, microscopically, infiltrations of eosinophiles could be seen round the larvae in the submucosa. Later, greenish tracks appeared. G. did not make any observations relating to the entry of the larvae into the oesophageal wall. In one case a larval track was observed in the mediastinum. The chief characters of the life-cycle of the two parasites are given in a table and there is a useful bibliography.—H. E. Harbour.

Yasuda, M. (1940). **[Morphology of the Larva of *Wohlfahrtia magnifica* Schin. Found in a Wound on a Camel in Inner Mongolia]**.—*J. Chosen nat. Hist. Soc.* **7.** No. 29. 27–36. [In Japanese]. [Abst. from abst. in *Rev. appl. Ent.* Ser. B. **30.** 4–5].

Descriptions are given of the second- and third-instar larvae of *W. magnifica*, taken from a wound on a camel in Inner Mongolia, together with a review of the literature on myiasis due to this fly.

Yokoo, T., & Hotari, J. (1941). **[Studies on the Blood-Sucking Insects of Sheep in Korea. I. On the Species, Morphology, and Bionomics of Blood-Sucking Flies]**.—*Oyo Dobuts. Zasshi.* **13.** 14–38. [In Japanese]. [Abst. from abst. in *Rev. appl. Ent.* Ser. B. **30.** 5].

Stomoxys calcitrans and *Lyperosia irritans* are common and widely distributed in Korea. Adults of *S. calcitrans* were found to live on the average two days without food, 7·2 days when fed 3% sugar solution, and 18·7 days when fed citrated rabbit's blood. Only those given blood oviposited, the pre-oviposition period being about 20 days. The adults emerged mainly in the daytime, and eggs were laid singly or in batches of up to 30 in horse dung, wet straw, and other decaying vegetable

matter, the average number laid per female being 77·3. There are 4–5 generations a year.

The flies are attracted by sunshine, and attack newly shorn sheep as well as cattle, horses, and other animals. Near Suigen, they appear in mid-May, increase in numbers in late June or early July, are most abundant in September, and disappear in late November. In sheep yards, they were observed to increase considerably after the beginning of July, to decrease in mid-August, and to increase again in late August and September.

*HOHORST, W. (1939). Die Mallophagen des Haushuhnes und ihre Eigelege. **[Mallophaga of the Hen and their Oviposition]**.—*Vet.-med. Nachr. "Behringwerke"*. No. 4. pp. 61–88. [Abst. from abst. in *Zbl. Bakt. I. (Ref.)*. **136.** 187].

H. examined 161 hens and the following lice were found :– *Menopon gallinae* in 153, *M. stramineum* in 119, *M. pallidulum* in 32, *M. cornutum* in 17, *Lipeurus caponis* in 93, *L. heterographus* in 41, *Goniodes dissimilis* in 77, *Goniocotes hologaster* in 127, and *G. gigas* in 39.

Control of the infestation is simple and good results were obtained with "malix", a dusting powder containing derris.—A. L. WILSON.

ONO, Y. (1941). [*Dermacentor reticulatus* **on the Camel in the Hailar Region, Northwest Manchukuo]**. —*Jap. J. vet. Sci.* **3.** 43–48. [In Japanese : abst. from German summary].

O. found 20 specimens of *D. reticulatus* on camels in Northwest Manchukuo. The ticks showed a predilection for the thin-skinned parts of the body. The blood of 90 camels examined was free from parasites. —A. L. WILSON.

DAVIDSON, W. B. (1941). **The Rocky Mountain Wood Tick and Tick Borne Diseases.**—*Canad. J. comp. Med.* **5.** 123–137.

A review of the literature and of D.'s experiences. This tick, *Dermacentor andersoni*, is the only tick known to cause paralysis of domestic animals and man in North America. The infections which it frequently carries and transmits are Rocky Mountain spotted fever, tularaemia, anaplasmosis, and a rickettsiasis in man thought to be related to "Q" fever in Australia. In some parts of Western Canada it has become necessary to institute methods of tick control. Animals are dipped three times at ten-day intervals. The cycle of development can be broken by destroying ground squirrels, rabbits and other small animals.—R. GWATKIN.

SHCHEGLOVA, A. I. (1939). **[Role of Wild Vertebrates on Forest Pastures as Intermediary Hosts of** *Ixodes ricinus***]**.—*Probl. Ecol. Biocenol.* No. 5–6. pp. 83–101. [In Russian : English summary]. [Abst. from abst. in *Rev. appl. Ent.* Ser. B. **29.** 159].

Investigations were carried out in 1935 in the Province of Leningrad to determine the species of wild animals occurring on the forest pastures which harbour various stages of *I. ricinus*. The pastures examined are described and tables show the 55 species of vertebrates taken, and the degree of infestation with adults, nymphs, and larvae of the tick. The species infested comprised 12 birds, nine mammals, and a lizard. The greatest numbers of ticks, chiefly larvae, occurred on mammals in the first half of summer, and especially on the shrew, *Sorex araneus*, and the rodents, *Apodemus flavicollis* and *Evotomys glareolus* ; the hedgehog, *Erinaceus europaeus*, was particularly heavily infested, but with more nymphs than larvae. Birds, particularly thrushes and *Anthus trivialis*, were infested chiefly in early summer by nymphs. Adults were found occasionally on hedgehogs and rarely on *Apodemus agrarius* and *Anthus trivialis*.

ONO, Y., & IKEDA, S. (1941). **[Sarcoptic Mange in Camels. I]**.—*Jap. J. vet. Sci.* **3.** 33–42. [In Japanese: abst. from German summary].

There are many camels in North and West Manchuria and they are important as domestic animals. A survey revealed that sarcoptic mange was the commonest disease encountered. A description is given of the parasite and the clinical symptoms of the infestation. —A. L. WILSON.

PALUSZKIEWICZ, E. (1939). Pasożyt—*Cytodites nudus* —w drogach oddechowych kur. [*C. nudus* **in the Respiratory Tract of Fowls]**.—*Przegl. wet.* **54.** 205–240. [Abst. from German summary].

The air-sac mite of poultry is usually described as of little pathogenic importance, although WATKINS [*V. B.* **11.** 111.] found heavy infestations of this parasite associated with some cases of avian TB. with involvement of the lungs, and also noted the occurrence of uncomplicated "air-sac mite disease".

P. detected the mites in 15% of fowls examined during the summer months and claims a mortality of as many as 10% of infested fowls to be directly due to the parasite. A massive infestation is said to cause oedema of the lungs and death from asphyxia, while a heavy chronic infestation results in nodules in the lungs and cachexia, anaemia, and death ; secondary bacterial infection may also result. Chicks and young birds up to 5–6 months are resistant to infestation ; in adult birds of ten months or more the mites are often very numerous, as many as 1,000 having been counted in a single host.

The parasite generally moves slowly but the rate of progress is increased on a moist surface. It clings to a surface by retractable suckers on each of the five-jointed legs. The female is oviparous and/or viviparous. The maximum number of eggs seen in one female was 9–11. The whole development is carried through in one host. A detailed description of the morphology of the mite is given.—H. E. HARBOUR.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

CARDONA, L. (1939). Contributo allo studio degli "Amphistomidi" sulla base di esemplari rinvenuti nei prestomaci dei bovini in Eritrea. **[Amphistomids in the Fore-Stomachs of Cattle in Eritrea]**.—*Azione vet.* **8.** 497–500.

C. reports widespread amphistome infestation of cattle in Eritrea. Remarking on the fact that the adult worms in the rumen do not apparently suck blood, he comments on the theory that the trematodes live on the infusoria of the rumen which normally assist protein digestion, thus diminishing digestion of proteins by the host.

The genera of amphistomids found are not named. Cattle in Eritrea are also infested with *Fasciola*, often simultaneously with the amphistomids, and the normal state of development of the cattle is poor.—M. WATSON.

NEUHAUS, W. (1938). Der Invasionweg der Lanzettegelcercariae bei der Infektion des Endwirtes und ihre Entwicklung zum Dicrocoelium lanceatum. **[Path of Entry of** *D. lanceolatum* **Cercariae and their Development to Maturity in the Definitive Host]**.— *Z. Parasitenk.* **10.** 476–512.

N. observed that in the snail, *Zebrina detrita*, the cercariae leave the sporocyst in the midgut glands and are carried by the bloodstream to the lung, whence they break out into, and encyst in, the pulmonary chamber.

One hundred or more cercarial cysts may stick together in a ball and up to three such collections of cysts have been observed in the pulmonary chamber of a single snail. The cysts are passed out by the snail through the respiratory pore, often in the slime balls left behind by the snail. The cysts are easily destroyed by drying and live for a few hours only in dry air at room temperature. They may remain viable for three weeks at a temperature of 1–5°C. in a moist atmosphere. Since most of the cysts are formed in late summer conditions generally do not favour the parasites. They probably live 2–6 days at this time of year, although this will depend on local weather variations.

For infection experiments, naturally infected snails were collected and irradiated daily with a "vitalux" lamp to cause maturing of cysts, which could then be obtained under suitable conditions of moisture.

Infection experiments were attempted in g. pigs and rabbits but these did not prove suitable hosts. Two sheep were then infected at intervals ranging from 144 days down to 5, 3, 2, 1, and ½ a day before killing. Washings from the liver, gall bladder, principal bile ducts, portal vein, stomachs, and intestines were examined and serial sections were made from parts of the intestine, the portal vein, the liver and various lymph nodes. In this way the progress of the various infections could be mapped out. It was shown that the cysts ingested usually pass through the stomachs without change, the cyst wall dissolving in the intestine. The cercariae then penetrate the gut wall and reach the portal vein, where they remain for some days. They reach the liver between the 5th and 8th days, leave the veins, and penetrate the bile ducts. The mature flukes later pass to the larger bile ducts and the gall bladder.

The cercaria throws off its tail and its anterior spine on reaching the liver. It completes its development in seven weeks and egg laying starts four weeks later. The development of the cercaria into the mature fluke is described in detail.—H. E. Harbour.

Alicata, J. E., & Swanson, L. E. (1941). **Observations on the Longevity of the Liver Fluke, Fasciola Gigantica, in Cattle.**—*Amer. J. vet. Res.* **2.** 417–418.

This investigation was carried out on five bullocks of weaning age on a ranch in Honolulu where no liver flukes have ever been noted in the cattle. Seven wild deer from this ranch were examined at the time and found to be free of flukes. Each bullock was fed 800 encysted *F. gigantica* in a 1 oz. gelatin capsule. Three months later all the bullocks were passing fluke eggs in the faeces. At 16 months there was a marked decrease in the number of eggs being passed in the faeces, and one bullock killed then harboured no mature flukes. At two years two bullocks were found to be quite free from infestation. In the other two bullocks the infestation persisted in a very minor degree up to three years four months after the dosage, when the last animal was killed. [No egg counts are given in the tabulation of the above results.]—C. V. Watkins.

*Stickdorn, E. (1939). Nachweis von Trematodeninvasionen mit Hilfe immunobiologischer Methoden unter besonderer Berücksichtigung der Präzipitation bei Leberegelbefall. **[Demonstration of Trematode Infestation by Immunological Methods with Special Reference to the Precipitation Method for Liver Fluke Diagnosis].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Zbl. Bakt. I. (Ref.)* **136.** 168].

The data obtained showed that the intradermal test for the diagnosis of liver fluke disease is not specific. The precipitation test is unreliable since, of 106 samples of bovine serum tested with various antigens, only 83·6% of the infested animals were detected while the serum from 33·4% of the uninfested animals gave a positive reaction. It is emphasized that faecal examination for fluke eggs is still the surest method of diagnosing fascioliasis.—A. L. Wilson.

Wu, K. (1938). **Schistosomiasis japonica among Sheep and Goats, with a Review of the Reservoir Hosts from China.**—*Far East. Ass. trop. Med., C.R. dixième Congr. Hanoi, 1938.* **2.** 721–725. [Abst. from abst. in *Trop. Dis. Bull.* **38.** 43].

Between March and June 1937, W. found *S. japonicum* in six (1·7%) of 355 sheep livers and in 16 (8·1%) of 196 goat livers examined at Shanghai abattoirs. Goats are not necessarily more susceptible, however, since these may have come from regions of greater endemicity.

W. had also found infection in other domestic animals. In oxen the percentage was 0·8–34·4, average 12·6, and in buffaloes 8·3–24·2, average 18·7. Four of 13 horse livers examined in 1938 were infected. Pigs with natural infections had not been found, but they were experimentally susceptible. Infection had been reported in dogs in Hunan, Kiangsu, and Chekiang, especially in hunting dogs enjoying an aquatic life. Six (9%) of 55 cats examined in villages in Chekiang harboured the parasite. A house rat was found to be infected, and W. thinks that there may be a high incidence among field rats in endemic areas.

Lászlo, F. (1941). Echinococcus in der Nebenniere von Schweinen. **[Echinococcus in the Adrenals in Pigs].**—*Dtsch. tierärztl. Wschr.* **49.** 488–489.

Two cases of the infestation are briefly described. The cysts occurred in the caudal end of the right gland in both cases and were of the size of a hazel nut.

—A. L. Wilson.

*Stoicesco, G. (1939). "Cysticercus pisiformis" chez le lièvre et le porc. **[*C. pisiformis* in Hares and Pigs].**—*C.R. Inst. Sci. Roumanie.* **3.** 457. [Abst. from abst. in *Bull. Inst. Pasteur.* **38.** 183].

2–3% of hares in Rumania harbour *C. pisiformis.* S. has also found this cysticercus in young pigs, whose internal organs, eaten by dogs, transmitted to them the adult worm. [The occurrence of this larva in pigs constitutes a most interesting host record. It is regrettable that the original cannot be consulted either for details of morphology of larva and adult, or in order to appraise the value of the feeding experiments performed.—Ed.]

Graham, G. L. (1939). **Studies on Strongyloides. IV. Seasonal Variation in the Production of Heterogonic Progeny by Singly Established *S. ratti* from a Homogonically Derived Line.**—*Amer. J. Hyg.* Sect. D. **30.** 15–27.

G. found a cyclical variation in the production of heterogonic progeny by *S. ratti* established in rats from a single homogonically derived larva. Observations were made on 153 worms over a four-year period and it was found that the frequency with which heterogonic larvae were produced from 24-hour faecal cultures was increased in spring and summer. There was a correlation between the monthly percentage of cultures yielding heterogonic larvae and the monthly mean maximum temperature. The relative humidity appeared to play an important role, for on five occasions the percentage frequency increased to its maximum 2–4 months after a major depression in R.H. G. concludes that meteorological conditions modify the reproductive activity of the parasite through the agency of the host, and not through variations in the environment to which the free-living larvae are exposed. The mode of larval development is determined prior to oviposition.

—M. L. Bingham.

ANDREWS, J. S., & MALDONADO, J. F. (1940). **A Preliminary Note on the Internal Parasites of Puerto Rican Cattle, with Special Reference to those Species found in Calves Suffering from "Tropical Diarrhoea".**—*J. Agric. Univ. P.R.* **24.** 121–132. [Spanish summary]. [Abst. from abst. in *Exp. Sta. Rec.* **85.** 821].

The condition known locally as "tropical diarrhoea" produces in affected calves anorexia, diarrhoea, anaemia, weakness, and emaciation, and is often fatal. It is said that in some sections of the island the raising of calves is almost impossible because of this disease.

The four species of gastro-intestinal helminths found most commonly in the 22 calves autopsied, of which eight had this disease, were *Bunostomum phlebotomum* (77·3%), *Oesophagostomum radiatum* (63·6%), *Cooperia punctata* (54·5%), and *Haemonchus contortus* (50%). These eight affected calves and one other not autopsied were 2–11 months old and came from all regions of the island. Eight cases occurred during January-March, and one in June. *Eimeria zürnii* and all four nematode species mentioned above, were recovered in large numbers from all affected calves. *Strongyloides papillosus* was also implicated in one case. *Dictyocaulus viviparus* was found to be the cause of verminous pneumonia in three calves, but the remaining 20 species of parasites found were held to be of little pathogenic importance in the calves examined. Of species reported by other workers as capable of causing gastro-enteritis in calves, those found were in numbers too small to be considered pathogenic. The nine cases of "tropical diarrhoea" were diagnosed as variously due to gastro-intestinal parasitism alone or complicated by malnutrition or by bacteria (pneumonia).

KAUZAL, G. P. (1941). **Examination of Grass and Soil to Determine the Population of Infective Larval Nematodes on Pastures.**—*Aust. vet. J.* **17.** 181–184.

A study of grass plots experimentally contaminated with infective larvae of *Haemonchus contortus* showed that the examination of grass alone, for the purpose of estimating the extent to which the area is infested with infective larvae, is not sufficient. A maximum of only 16% of the larvae originally added was recovered from the grass, whereas the maximum from the soil was 75%. Considerable fluctuations in the number of larvae present in the soil and on the grass were observed and could be correlated with the existing weather conditions. Successful recovery of larvae from grass pasture was dependent on the presence of an optimal number of grass blades on which migration could take place, on favourable weather conditions, and on the vitality of the larvae.—H. McL. GORDON.

KOTLÁN, S., & MÓCSY, J. (1940). Az idei szarvasmarha-tüdőfégesség elter-jedési okairól. **[Causes of the Present Year's Great Increase in Lungworm Disease in Cattle in Hungary].**—*Állatorv. Lapok.* **63.** 149–150. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 151].

Observations suggest that the operation of predisposing factors is necessary for massive lungworm invasion and for the appearance of clinical symptoms. The most important of such factors seems to be poor diet. The lowering effect of other parasitic infestations, *e.g.* the bunostomiasis at present rampant in young cattle, is also significant. Control and treatment of stomach worm infestation and attention to diet are therefore of equally decisive importance in curbing the increase of lungworm disease.

GALVÃO, A. L., & DO AMARAL, A. D. F. (1939). Dermatite linear serpiginosa das praias do litoral paulista. **["Creeping Eruption" Caused by Dog Hookworm Larvae in Human Beings on the Paulista Coast].**—*Arq. Hig. Saúde públ., S. Paulo.* **4.** No. 7. 73–90. [English, French and German summaries].

The authors studied the linear serpiginous dermatitis affecting human beings on the coast of São Paulo and found that it was caused by the larvae of *Ancylostoma braziliense* which infests many of the domestic dogs of the region.

The dermatitis was produced experimentally by applying larvae to unbroken or scarified human skin. On the unbroken skin, 49 larvae in a drop of water produced only one parasitic tract in the dermis whereas about 30 larvae mixed with damp sand produced 14 linear lesions.

Dogs from the coast at Guarujá proved to have both *A. braziliense* and *A. caninum* infestations but the number of the former was greater. In the city of São Paulo only *A. caninum* was found. Sand from the shore at Guarujá and São Vicente (near Santos), at places frequented by bathers, was found to contain larvae. Wild canines from the same district are infested with *A. braziliense* and no doubt play a part in the dissemination of larvae.—MILLER WATSON.

DISEASES, GENERAL

BROWNLEE, A. (1941). **A Contribution to the Study of some Ecological Factors Concerned in the Pathogenesis of Diseases of Domestic Animals.**—*Vet. J.* **97.** 366–380. [The word "Etiological", which occurs in the original title, is a misprint for "Ecological"].

This is an attempt to analyse the relationship between environment and the onset of specific infectious and non-infectious diseases in animals. B. makes an extensive survey of the literature on the influence of environment on various animal diseases and discusses such factors as exercise, transport, fright, cold and wet, trauma, dipping and washing, irritation from parasites, fatigue, psychic factors, defective ventilation, and unhygienic housing, etc.—N. J. SCORGIE.

ZWICKY, H. (1941). Einige Förderer gesundheitlicher Störungen beim Rind. **[Some Factors which Upset the Health of Cattle].**—*Schweiz. Arch. Tierheilk.* **83.** 113–124.

By means of a questionnaire, Z. has studied the possible relation between the use of liquid manure on lowland farms in Switzerland and the incidence of bovine TB. The study was carried out on 113 herds. A number of other factors such as breed, diet, water, pasture, and general hygiene were also considered. The general conclusion is that intensive use of liquid manure is associated with an increased incidence of TB. This is aggravated by the use of automatic individual and stall drinking troughs, which are considered also to be responsible for an increased incidence of infectious abortion and infertility.—E. G. WHITE.

*HILLEBRAND, J. (1940). Pathologisch-anatomische Befunde der Tropenkrankheiten des Pferdes in unseren afrikanischen Kolonien. **[Pathological Findings in Tropical Diseases of the Horse in Africa].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 76].

A review of the literature with facts on the pathology of epizootic lymphangitis, dourine, nagana, surra, piroplasmosis, African horse sickness, filariasis, "dunziekte", "jaagziekte", dermatitis granulosa, and other conditions.

*Christensen, E., & Nielsen, F. W. (1941). Om paaviste Reaktioner for bovin Tuberkulose og for smitsom Kastning blandt Kvierne paa Statens Opdraetningscentral, Store Vildmose. **[Bovine TB. and Brucellosis at the State Breeding Centre (*Store Vildmose*) Denmark].**—*Medlemsbl. danske Dyrlaegeforen.* p. 158. [Abst. from abst. in *Skand. VetTidskr.* **31.** 230].

The authors discuss the group of State farms, at a centre known as *Store Vildmose*, which are devoted to the rearing of young cattle free from TB. Cattle 6–12 months of age which have passed the tuberculin test and which come from herds infected with TB. are eligible for admission to the centre where they are retained for two years. The other conditions for admission are dealt with in detail by the authors. Identification of the animals is by ear tattoo and a chain, carrying an identity disc, locked around the neck. The brucellosis blood test and a tuberculin test are carried out during residence at the farms. During the period 1935–40, 9,429 cattle were tested of which 1·08% reacted to the former and 1·17% to the latter test. Since 1938, the centre has been rearing TB.-free stock for delivery to State-aided smallholdings.—G. B. Brook.

Okuntsov, I. V. (1939). O diferentsial'noĭ diagnostike infektsionnoĭ anemii, nuttallioza i piroplazmoza loshadeĭ. **[Differential Diagnosis Between Equine Infectious Anaemia, Nuttalliasis, and Piroplasmosis].**—*Sovyet. Vet.* No. 10–11. pp. 46–50.

O. describes the main differential features of E.I.A. and equine piroplasmosis. No new indications are described.—A. Moldawsky.

*Grossman, F. (1939). Verbreitung der Verkalbeseuchen (Trichomoniasis und Bruzellose) in Kurhessen. **[Prevalence of Trichomoniasis and Contagious Abortion in Kurhessen].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Feb. 14th. 82. (1941)].

In Kurhessen trichomonad abortion in cattle is much more common than brucellosis, which has been detected in only 4% of the herds. It is emphasized that when sterility, pyometra, and cases of abortion in the early stages of pregnancy are encountered in a herd, trichomonad infection should be suspected. Confirmation of diagnosis is difficult as microscopic examination revealed infection in only 9·6% of cases, and cultural methods did not always prove reliable. Vaginal inflammation with papule and fold production does not always occur.

An attempt was made to obtain a diagnostic allergic reaction by the injection of extract of trichomonads, but the results were irregular. Work on the production of an allergic reaction is being continued.—U. F. R.

Fritzsche, K. (1941). Beobachtungen über Krankheiten bei Wisenten. **[Observations on Diseases of Bison].**—*Dtsch. tierärztl. Wschr.* **49.** 412.

F. describes a variety of pathological conditions in a herd of 10 European and 11 American bison in a park in Poland. During recent years, three European bison had to be destroyed on account of multiple spontaneous fractures, probably due to osteoporosis. It is suggested that phosphorus deficiency was responsible and the addition of hay from land rich in mineral salts was apparently successful in preventing further cases. No deficiency disease appeared in the American bison.

Other diseases encountered included foot and mouth disease, piroplasmosis, and a peculiar condition affecting a European bison in which there were numerous chronic abomasal ulcers P.M.—E. G. White.

Jakeman, H. W. (1940). **Diseases of Swine.**—*Canad. J. comp. Med.* **4.** 65–68 and 100–103.

A general discussion from the practitioner's viewpoint of diseases of swine in the U.S.A.—R. Gwatkin.

Asdell, S. A., & Willman, J. P. (1941). **The Causes of Stillbirth in Swine and an Attempt to Control It.**—*J. agric. Res.* **63.** 345–353.

The literature on stillbirths is reviewed and a comparison made between the authors' observations in swine during 1930–35 and cases reported by other workers in man, swine, and albino rats. Three breeds of pigs were observed; of 1,882 piglets born, 125 were stillborn. At the beginning of the period, the proportion of aged sows was high, but later first-litter sows predominated. No infection with *Brucella suis* was observed in the piglets. Losses were much greater on an average during the last half of the farrowing periods; a figure is given which shows the order of farrowing of dead piglets in 26 farrowings. Percentage losses were higher in large litters than in smaller ones. The average weight of the stillborn piglets was 2·1 lb. as compared with 2·6 for all pigs farrowed.

An attempt to hasten birth by the injection of pituitrin seemed at first to reduce mortality, but later work has thrown doubt on the value of this procedure.—C. V. W.

Chitty, D. (1940). **Canadian Arctic Wild Life Enquiry, 1938-39.**—*J. Anim. Ecol.* **9.** 227–242.

Chitty, D., & Chitty, H. (1941). **Canadian Arctic Wild Life Enquiry, 1939-40.**—*Ibid.* **10.** 184–203.

These reports are a continuation of the three already noted [*V. B.* **10.** 603.] and are based on the same sources of information. During 1938–39, there were severe outbreaks of what was presumably canine distemper among the sledge teams: analysis of the available data suggests that the outbreaks were spread by contact from team to team and that there was no evidence of widespread "crazy disease" or of any relationship between the canine epizootic and disease in wild life. In the following year evidence from one area showed that the disease had been largely checked by quarantine measures. No other form of prophylaxis was employed.—Alastair N. Worden.

Kawahara, Y. (1941). **On the Diagnostic Value of the "Stamp-Smear Method" in the Case of Cervicitis of Pregnant Mares.**—*Jap. J. vet. Sci.* **3.** 191–203. [In Japanese: abst. from English summary].

K. examined the cervical mucus in 23 pregnant mares which showed evidence of cervicitis. He found that the presence of mucus globules is of diagnostic value even when cervicitis is present, and that lymphocytes, sticky mucus, and mucous epithelial cells, which constitute the normal pregnant smear, are greatly increased.

—N. J. Scorgie.

McFarlane, A. (1941). **Suspected Cases of Grass Disease in Northern Ireland. I.**—*Vet. Rec.* **53.** 762–763.

McColl, W. (1941). **Suspected Cases of Grass Disease in Northern Ireland. II.**—*Ibid.* 763.

Lee, J. A. (1941). **Suspected Grass Disease in the Midlands.**—*Ibid.* 763.

Cases are recorded in three horses in which a tentative diagnosis of "grass sickness" was based upon the following symptoms which were common to them all, *viz*, difficulty in swallowing, patchy sweating and muscular tremors associated chiefly with the fore part of the body, hard, dry faeces (except in one case), and a progressive emaciation. A "tucked up" appearance was seen in each case. Symptomatic treatment, consisting largely of the administration of stimulants and laxatives, had no effect.

Autopsies were carried out on two of the cases, but lesions were indefinite; in both cases, however, a corrugation and congestion of the mucous membrane of the small intestine was recorded, which resembled the changes characteristic of Johne's disease of cattle.
—N. S. BARRON.

STUBBS, E. L., & LOVE, W. G. (1941). **Studies on the Relationship of Brucellosis to Periodic Ophthalmia.** —*J. Amer. vet. med. Ass.* **99.** 476–480.
A study of 40 cases of equine periodic ophthalmia failed to show any relationship to brucellosis. All the animals were submitted to agglutination tests. Only six showed reactions and these were in low dilutions.
—D. D. OGILVIE.

*LORBEER, S. (1940). Beitrag zur Vererbungsfrage der periodischen Augenentzündung des Pferdes. **[The Question of Heredity in Periodic Ophthalmia].** —*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **48.** 430].
From a study of the herd book records of two studs, L. found that periodic ophthalmia occurred to a noticeable degree in the progeny of certain stallions. The same animals showed a tendency to be affected with other diseases also, *viz*, conjunctivitis, keratitis, rheumatism, urticaria, and skin diseases. L. suggests that this indicates an allergic diathesis which is inherited as a simple recessive factor.

*LANGSENKAMP, H. (1940). Erbanalytische Untersuchung über die spastische Spinalparese des Rindes im Bereich des Zuchtgebietes der Osnabrücker Herdbuchgesellschaft. **[Investigations on the Heredity of Spastic Spinal Paralysis of Cattle of the Osnabruck Herd Book Society].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 418].
By a study of the family lines of 41 cases it was established that the condition was a recessive inherited factor.

ANNETT, H. E. (1939). **Note on a New Recessive Lethal in Cattle.**—*J. Genet.* **37.** 301–302.
This records the occurrence in New Zealand of a lethal character in five calves out of 28 which were the result of sire × daughter matings. Eighty-two other calves got by the same bull to unrelated cows were all normal. In the abnormal calves the lower jaw was only half the normal length, so that the calves were unable to suck and would subsequently have been unable to graze.
—N. J. SCORGIE.

BARECGI, G. (1939). Lesione dei genitali maschili e sterilità. **[Lesions of the Male Genital Organs and Sterility].**—*Atti 1a Adun. naz. Vet. Fecond. artif., Pavia, 1939.* pp. 77–86. Milan: Istituto per la Fecondazione Artificiale. [In Italian. Discussion pp. 86–90].
B. reviewed the various infectious diseases of the male genitalia and gave an account of his own research. In orchitis due to *Brucella abortus* he found foci of a fibrous, caseous, or granular nature in the testicular parenchyma, and these foci tended to coalesce. The tunica propria was nearly always involved, being thickened and injected on the outer surface which was also roughened by fibrinous exudate. In more advanced cases the testicles were almost wholly fibrous. Microscopically, the early lesions showed desquamation of the tubular epithelium with considerable leucocytic infiltration. The destroyed tubules were replaced by fibrous tissue. In tuberculous orchitis the lesions tended to remain more localized in the form of nodules which did not coalesce and the epididymis was particularly affected. In some of the cases of orchitis due to brucella infection, B. found marked eosinophilic infiltration which he considered to be due to a concurrent trichomoniasis.

In one herd with 35% sterility B. found the bull to be affected with orchitis due to brucellosis and possibly complicated by trichomoniasis. The sterile cows included 15 with catarrhal cervicitis or metritis, 7 in anoestrus with persistent corpora lutea and apparently normal uteri, 3 cases of nymphomania, 2 cases of pyometra in cows served a few days before by the bull, 1 pyometra with 10–15 litres of pus containing numerous trichomonads, 1 metritis in a recently calved cow, and 6 cases of sterility of unknown aetiology.

B. examined 22 bulls which showed abnormal semen (collected in artificial vagina). One bull had tuberculous orchitis and epididymitis. Another had a cystic epididymitis of unknown aetiology. Thirteen bulls were affected with orchitis due to brucellosis and seven more had early lesions suggesting brucellosis. In 12 cases there was marked eosinophilic infiltration of the testes, epididymis, ducts, and prepuce and one case proved to be infected with trichomonads.

B. examined the semen from many bulls with orchitis or other genital lesions and found the following characteristics :– considerable numbers of both monocytes and polymorphs, desquamated epithelial cells from the seminiferous tubules, ducts, and urethra, and giant cells in tuberculous cases. Great variation in the density of the fluid was noted, oligospermia was common, the spermatozoa were feebly motile (or showed little progressive motility), and abnormality of morphology was evident, such as weak development of the tails, twisted tails and absence of tails, while some sperms lacked the " propulsion granules ".—MILLER WATSON.

FINCHER, M. G. (1941). **Retained Placenta.**—*J. Amer. vet. med. Ass.* **99.** 395–404.
F. reviews various theories regarding the aetiology of retained placenta. He concludes that in the majority of cases the ultimate cause is unknown; as a result of his own experience he suggests that less than one-third of the cases are due to *Brucella abortus* infection. In herds where the incidence has been known to be high, he reports good results following the injection of pituitrin immediately after parturition. The results of the treatment of 3,500 cases in cattle are discussed, with the conclusion that the placenta should be left alone long enough to allow sufficient necrosis to take place before manual removal is attempted. The uterus should receive appropriate local treatment. F. reports that in the control of septic metritis, intravenous medication with dextrose and calcium gluconate, and sulphanilamide chemotherapy have apparent value. It is stated that the closure by metal suture clamps of the dorsal part of the vulva seems to be beneficial in the treatment of retained placenta and metritis in the mare.—N. J. S.

CREECH, G. T. (1941). **Arteriosclerosis in Cattle Associated with Pulmonary Ossification.**—*Amer. J. vet. Res.* **2.** 400–406.
C. states that only about 60 cases of arteriosclerosis, admittedly advanced cases, have been brought to the notice of the laboratories of the Bureau of Animal Industry during the last 25 years, which suggests that these vascular lesions in cattle are rare in the U.S.A. Very few cases in pigs and sheep have been noted. The cause of the condition in animals is obscure. The incidence in cattle of 2–4 years old was about three times that in animals of over five years. It seems probable that the early lesion is a vascular weakening. Proliferative changes to repair the damage, possibly involving the entire vessel wall, then occur and may be followed by necrosis and calcification. In about 25% of cases the vessels of the parenchymatous organs have

been grossly involved. In such cases there has been an associated ossification throughout the lungs in the form of thin spicules of bone which break and crackle when crushed. C. describes and illustrates the gross and histopathological lesions in a case in an 18-month-old heifer.—C. V. WATKINS.

BANKIER, J. C. (1941). **Enzootic Bovine Haematuria (Haematuria Vesicalis). A Means of Controlling the Bladder Haemorrhage.**—*Canad. J. comp. Med.* **5.** 247–249.

A method of controlling haemorrhage from the bladder has proved of definite benefit and its use is especially indicated when clinical evidence of haematuria is first observed. A 50% solution of glycerin containing 10% of a 16% aqueous solution of iodine, or tincture, is warmed to body temperature and, after the bladder has been drained and coagulated blood removed, 400 ml. of the solution are injected. The solution should be retained for 3–4 min.; it is somewhat irritating and steps have to be taken for it to be retained for that interval. Apart from any direct action on the lesions, the solution produces a pronounced oedema of the bladder wall. This apparently produces sufficient pressure on the blood vessels in the submucosa to arrest or reduce the blood supply to the lesions for a long enough period to enable the capillaries to heal, following which many of the lesions, both pedunculated and sessile, undergo a process of granulation. If haemorrhage is not noticeably controlled by two treatments a week or ten days apart, the case is likely to be a hopeless one.—R. GWATKIN.

BOUGHTON, I. B. (1941). **Sporadic Bovine Encephalomyelitis.**—*Tex. vet. Bull.* **3.** No. 3. 1–3.

B. describes a sporadic, subacute brain disease of calves 1–12 months old, occurring on 12 ranches in Texas during the previous two years. Usually only 2 or 3 calves were affected, but in one herd the disease occurred in half the calves. Complete recovery, after the appearance of alarming symptoms, took place in 50% of cases. The disease is almost certainly the same as that described in Iowa by MCNUTT [*V. B.* **11.** 540]. The course and symptoms of the disease are described. No gross brain lesions were found, but microscopic lesions of liquefaction necrosis, cuffing of the blood vessels, and infiltrations with monocytes and oedema of all parts of the brain and cord were noted.

Bacteria could not be proved to be the primary cause of the condition, nor were filtrates of infective material pathogenic for calves or g. pigs. Emulsions of brain, peritoneal fluid, liver, and spleen injected subcutaneously into calves produced the disease within 5–15 days. G. pigs were more susceptible to intraperitoneal injections; an indefinite immunity was set up in one recovered g. pig. Sheep were not susceptible to infection and contact spread could not be induced. In both g. pigs and calves a sero-fibrinous pleurisy and peritonitis were constant findings. No specific treatment has yet been determined.—C. V. WATKINS.

*HASHIZUME, K. (1940). **[Lumbar Paralysis of Goats].** —*Bull. imp. Zootech. Exp. Sta.* [*Tiba-si*]. **38.** 1–53. [In Japanese]. [Abst. in *Biol. Abstrs.* **16.** 192, copied *verbatim*. Signed: MASUO KODANI].

This disease occurs only in imported breeds, never in the hybrid of the imported and domestic breeds, but it may occur in the backcross offspring of the hybrid to the imported breeds. Its incidence varies from yr. to yr. It is most frequent in Aug. and Sept. equally in both sexes at all ages. The symptom varies from a slight difficulty in walking to an extreme nervous disorder and it takes varying courses of development. No lesions in the internal organs were found common to the 9 cases of death due to this disease. Congestion of meninges was frequently observed in the brain and cord. No effective curative or preventive method was found though cooling of the head or removal of blood or spinal fluid was somewhat effective. During a rapid progress of the disease a high pressure of spinal fluid and cell count as well as an abnormal Takada-Ara reaction curve may be shown. Erythrocytes and leucocytes increase while eosinophiles decrease at the beginning and gradually return to normal. Culture and inoculation studies did not indicate a bacterial cause of this disease. Humidity, amt. of rainfall and atmospheric pressure seem to have no relation to this disease.

PIRANI, A. (1939). Nuovo contributo alla conoscenza della pleuro-polmonite infettivo-contagiosa delle capre in Eritrea. **[Caprine Contagious Pleuro-Pneumonia in Eritrea].**—*Riv. milit. Med. vet., Roma.* **2.** 551–559.

In the course of work on caprine pleuro-pneumonia in Eritrea a small number of experiments was carried out, from which it is concluded that the disease is primarily due to a filtrable virus but that the pathology is largely dependent on the associated pasteurella. The pasteurella loses its virulence in cultures, and these can be used as vaccines.—U. F. RICHARDSON.

LANGHAM, R. F., & HALLMAN, E. T. (1941). **The Incidence of Glomerulonephritis in Domesticated Animals.**—*J. Amer. vet. med. Ass.* **99.** 471–475.

The authors have studied the morbid anatomy in 236 cases of nephritis in all species of domestic animals. Only seven of these cases were classified as glomerulonephritis, and although the pathology was not identical with that described for man, the extent and distribution of glomerular lesions appeared to justify this classification. This article contains details of two illustrative case records. The primary lesions involved the glomeruli and were characterized by thickening of the basement membranes, increased amounts of connective tissue, and hyalinization. The tubules showed secondary changes characterized by cloudy degeneration, atrophy, and gradual replacement as the result of the intensive productive tissue changes. The bulk of the paper consists of figures.—N. J. SCORGIE.

LAMOREUX, W. F. (1940). **The Influence of Intensity of Egg Production upon Infertility in the Domestic Fowl.**—*J. agric. Res.* **61.** 191–206. [Author's summary copied *verbatim*].

An analysis of the incubation records of more than 1,200 hens was made to determine the relationship between the proportion of eggs laid which are infertile and the rate of egg production.

The hens which laid 13 to 22 eggs during a 6-week period produced a larger proportion of infertile eggs during that time than birds which laid at a more rapid rate.

The eggs laid during weeks when one to seven eggs were laid showed, respectively, a degree of infertility which was inversely proportional to the number of eggs laid per week.

The proportion of infertile eggs was significantly higher among those which were laid in clutches of one to three eggs than in those laid in clutches of more than three.

During periods when the rate of ovulation is low, hens copulate less frequently and probably have a shorter duration of fertility following insemination. These two factors, particularly the first, are believed to be responsible for the high level of infertility among eggs laid during periods when the intensity of production is low.

The duration of fertility following artificial insemination was not prolonged by daily injections of 100 rat units of Progynon-B per bird.

Sexual receptivity in the fowl was influenced only slightly, if at all, by 12 daily injections of 100 to 1,000 rat units of Progynon-B.

*Fazekas, J. (1940). **[Tumours and Leucosis in Fowls].**—*Thesis, Budapest.* [Translation of abst. in *Berl. Münch. tierärztl. Wschr.* Oct. 17th. 505. (1941)].

Out of 2,600 fowls examined, there were 14 with tumours and 26 with leucotic changes. Nine of the tumours occurred in the ovary (*viz*, cystadenoma, fibrolipoma, haemangiosarcoma, round-celled sarcoma, fibrosarcoma, and adenofibrosarcoma), one large-celled sarcoma occurred in the liver, one small-celled sarcoma in the thigh, and one fibrosarcoma in the subcutaneous tissue.

Twenty-five of the leucotic cases were of the lymphatic types and the other was a case of mixed myelosis and lymphatic leucosis. The lymphatic leucosis was transmissible by intravenous injection.

McDonald, S., Jr., & Woodhouse, D. L. (1942). **On the Nature of Mouse Lung Adenomata, with Special Reference to the Effects of Atmospheric Dust on the Incidence of these Tumours.**—*J. Path. Bact.* **54.** 1–12. [Authors' summary copied *verbatim*].

1. Histological investigation of a series of 71 primary tumours of the mouse lung has been undertaken. Of these, 69 (97·2 per cent.) had the structure of the Tyzzer adenoma. It is considered that this lesion originates and spreads by metaplasia and proliferation of the alveolar epithelium, bronchiolar epithelium also participating in the proliferative process. Destructive invasion of the lung is not a feature of this growth. The remaining 2 tumours (2·8 per cent.) had typical carcinomatous characters. Attention is drawn to the close morphological similarity between the Tyzzer adenoma and epizootic pulmonary adenomatosis in Icelandic sheep.

2. A series of albino mice has been exposed to the inhalation of atmospheric dust, in which benzpyrene was demonstrated by spectroscopic analysis. A further series was painted with dust extract. The Tyzzer adenoma incidence was 22·8 per cent. in the dust inhalation group and 25 per cent. in the dust extract painting group as compared with a 14·3 and 15·8 per cent. incidence in the controls.

NUTRITIONAL AND METABOLIC DISORDERS

Kernkamp, H. C. H. (1941). **Diseases of Swine Due to Nutritive Deficiencies.**—*J. Amer. vet. med. Ass.* **99.** 373–381.

A review for practitioners which summarizes information obtained mainly from experimental papers. There is little new material, but stress is laid on the importance of adequate protein and water intake, and on the necessity for supplying optimal amounts of Ca, P, Fe, I (in appropriate regions), and of vitamin A, vitamin B complex, and vitamin D. The clinical form of "deficiency disease", *i.e.* the slow onset, chronic course, and high incidence of cases, is discussed.

K. states that he has many records of necrotic enteritis in animals, the diet of which appears to have contained adequate amounts of nicotinic acid.—A. N. W.

*Ullmann, S. (1939). Blutzuckerbestimmungen bei kranken Rindern unter besonderer Berücksichtigung der Azetonurie. **[Blood Sugar Determination in Diseased Cattle with Special Reference to Acetonuria].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* June 20th. 304. (1941)].

U. discusses the value of glucose therapy and indicates some conditions for which it is particularly useful, *viz*, for all secondary circulatory disturbances arising from infections of the peritoneum, the liver, the uterus in labour, the udder or the hoof, and in fevers, paralysis, and comatose and tetanoidal conditions associated with pregnancy, labour or lactation, although the Ca-Mg treatment must also be given at the same time.

The blood sugar values were estimated in 59 cattle, some healthy, some diseased. The mean value of 96 estimations on eight normal cattle was 62 mg./100 ml. blood, the range of variation being 45–83 mg.

In cattle with acetonuria the blood sugar level was lower than in other diseased animals.—F. Aylward.

Huffman, C. F., Conley, C. L., Lightfoot, C. C., & Duncan, C. W. (1941). **Magnesium Studies in Calves. II. The Effect of Magnesium Salts and Various Natural Feeds upon the Magnesium Content of the Blood Plasma.**—*J. Nutrit.* **22.** 609–620. [For part I, see *V. B.* **5.** 667].

Calves developed hypomagnesaemia on a basal ration of whole milk supplemented with Fe, Cu, and Mn, with or without the addition of starch or a cereal product rich in carbohydrate. With the incorporation in the basal ration of small amounts of maize, lucerne hay, or maize gluten meal, corresponding to a total Mg intake of 12–15 mg. per kg. body weight, plasma Mg levels were maintained within the normal range, but a total Mg intake of 30–40 mg. per kg. was necessary to maintain normal plasma values when the basal ration was supplemented instead with Mg salts. The same amounts of Mg supplied in the form of the ash of lucerne hay were less effective in maintaining normality than the Mg salts.

The suggestion is made that the utilization of Mg by growing calves is more efficient when Mg is furnished by natural foods than when it is supplied in the form of Mg salts, and that milk may be deficient in some factor for normal Mg metabolism in the young bovine.—A. E.

*Essing, A. (1939). Ueber den Magnesiumgehalt im Kot gesunder Haustiere und seine Veränderung bei lecksuchtkranken Ochsen. **[Magnesium Content of the Faeces of Healthy Domestic Animals and its Alteration in Oxen with Pica].**—*Inaug. Diss., Berlin.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Aug. 15th. 402. (1941.)].

Discusses Mg content of faeces of horses, oxen, and sheep on normal dietary and of oxen fed on pica-producing hay. It is stated that with the progress of pica, faecal Mg is increased and urinary Mg decreased.

[Mg content of faeces of course depends primarily on Mg content of the food consumed. The German abstract is physiologically obscure and does not indicate whether proper balance experiments were conducted or not. In absence of the original it is impossible to say whether the data have any significance at all.]—H. H. G.

Killham, B. J. (1941). **Cobalt Deficiency in Some Michigan Cattle.**—*J. Amer. vet. med. Ass.* **99.** 279–282.

A report is given of a deficiency disease occurring in cattle in Michigan. The condition is sometimes called Grand Traverse or Lake Shore disease and the chief symptoms appear to be unthriftiness, emaciation, loss of appetite and development of pica, associated with low haemoglobin levels. Administration of 22–45 mg. of cobalt sulphate or 130 mg. of cobaltous chloride daily

resulted in a marked improvement in appetite, general condition and production, and a regeneration of haemoglobin after a further temporary decrease. Biochemical investigation [data not given] showed no evidence of P deficiency or of ketosis and preliminary analyses of hay samples from affected areas demonstrated that the Co content was 0·03–0·06 p.p.m. compared with 0·12 p.p.m. for hay from normal pastures.—R. ALLCROFT.

UNDERWOOD, E. J., & BECK, A. B. (1941). **Enzootic Marasmus : The Relation of Copper to Incidence and Treatment.**—*Aust. vet. J.* **17.** 155–165.

It has been shown that small, regular doses of cobalt chloride will cure enzootic marasmus in sheep and cattle [see FILMER *et al.*—*V. B.* **8.** 111]. The present experiments were designed to ascertain the effect of copper supplements as well as Co on the aetiology of the disease, as it had been observed that the Cu content of livers from several sheep in affected areas was very low. Twenty healthy Border Leicester × Merino weaner wethers were brought on to a property in the Denmark district, Western Australia, where enzootic marasmus was known to occur. Over a period of nine months the sheep lost condition and developed symptoms of enzootic marasmus. Treatment of one group with 2 mg. Co thrice weekly, and of another group with 2 mg. Co + 10 mg. Cu thrice weekly was carried out over the succeeding 13-month period. Details are given of haemoglobin and blood Cu levels, Cu and Fe content of liver, kidney, and spleen of individual animals, changes in liveweight, and the Cu content of pastures grazed by the experimental animals.

No effect on growth or haemoglobin levels from the use of Cu was found either during recovery from the disease or in the later stages of treatment, although by this time the sheep receiving the Co supplement had been for 22 months without Cu other than that obtained from the grazing. Significant falls, however, in the blood Cu levels were found during the last 6–7 months of treatment. No sign of stringy wool was found in these sheep at either the first or the second shearing.

The Fe content of the liver, kidneys, and spleen at the end of treatment was found, in all cases, to lie within normal limits, but the Cu content of the livers of the sheep receiving no Cu supplement was well below the levels usually reported for healthy sheep.

The authors conclude that enzootic marasmus is due to a deficiency of Co uncomplicated by lack of Cu.

—M. C. FRANKLIN.

HIRSCHFELD, E. (1940). **The Phosphorus Problem in Western Queensland.**—*Qd agric. J.* **54.** 196–207.

H. discusses field experiences gained on his property in Western Queensland. Soil analyses had shown that the soil contained adequate supplies of lime and potash but was deficient in phosphorus, particularly in layers below the first 3–5 in. horizon. It is claimed that feeding bone-meal licks to the Aberdeen-Angus cattle on the property increased fertility, secured earlier maturity, prolonged the life of the older cows, and tided the stock over the winter months and dry spells by enabling them to make better use of the dried grasses.—M. C. F.

LILLIE, R. D., DAFT, F. S., & SEBRELL, W. H., Jr. (1941). **Cirrhosis of the Liver in Rats on a Deficient Diet and the Effect of Alcohol.**—*Publ. Hlth Rep., Wash.* **56.** 1255–1258.

Rats maintained on a diet low in protein and the sulphur-containing amino acids developed cirrhosis of the liver during an experimental period of one year. The pathological changes were more severe when approximately 20% alcohol was substituted for the drinking water. The role of alcohol in the production of hepatic cirrhosis is not known.—R. ALLCROFT.

CRANDALL, L. A., FINNE, C. O., & SMITH, P. W. (1941). **Experimental Anti-Pernicious Anemia Factor Deficiency in Dogs.**—*Science.* **93.** 549–550.

Fifteen bile fistula dogs developed macrocytic hyperchromic anaemia corresponding to the condition found in pernicious anaemia and sprue in man. Intramuscular injections of liver extract resulted in a return of the blood picture to normal and it is suggested that this experimental production of macrocytic anaemia which is responsive to liver extract may provide a method of assay for the anti-pernicious anaemia factor. The normal blood picture for dogs is also given.—R. A.

PAVCEK, P. L., & BAUM, H. M. (1941). **Relation of Cystine to Achromotrichia.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 271–272.

Cystine at a level of 75 mg. per animal daily appeared to enhance the curative effect of pantothenic acid on rat achromotrichia when it was added to a basal diet containing 18% casein. It has previously been recorded that this amount of casein contains inadequate cystine for normal rat growth.—ALASTAIR N. WORDEN.

I. TOPPING, N. H., & FRASER, H. F. (1939). **Mouth Lesions Associated with Dietary Deficiencies in Monkeys.**—*Publ. Hlth Rep., Wash.* **54.** 416–431.

II. TOMLINSON, T. H., Jr. (1939). **Oral Pathology in Monkeys in Various Experimental Dietary Deficiencies.**—*Ibid.* 431–439.

I. Groups of *Macacus rhesus* monkeys consisting of four animals each were maintained on diets deficient in vitamins A, D, C and certain members of the B_2 complex, *viz*, riboflavin and nicotinic acid. Control animals were maintained on diets supplemented with the vitamins under test. Routine observations were made on each monkey until death occurred or throughout the 210 days of the experiment. The condition of the oral cavity was particularly observed and after death photographs and pathological examinations were made of the mouths of the monkeys. Oral lesions were present in all the animals on diets deficient in vitamins D, C, riboflavin, and nicotinic acid ; the lesions in the A deficient group were very slight. The results indicate that these dietary deficiencies are associated with the development of varying manifestations of gingivitis, stomatitis, periodontal disease, and noma.

II. A report is given of the histopathology of the oral lesions which occurred in 39 of the monkeys maintained on the deficient diets described in I. The development of the necrosis of the periodontal tissues and oral mucosa due to the vitamin deficiencies was similar in all the groups but probably of greatest extent in the B_2 deficient group.—R. ALLCROFT.

CHAPMAN, O. D., & HARRIS, A. E. (1941). **Oral Lesions Associated with Dietary Deficiencies in Monkeys.**—*J. infect. Dis.* **69.** 7–17.

Experiments conducted on 50 monkeys (*Macacus mulatta*) provided general confirmation of the results of TOPPING & FRASER [see I of preceding absts.]. Animals on vitamin C deficient diets and on certain multiple vitamin B deficient diets developed severe gingivitis and died in about 50–150 days. In addition to nicotinic acid, riboflavin, and vitamin B_6, filtrate factor was an essential dietary constituent.

Animals which received an adequate stock diet of "dog pellets", fresh fruit and vegetables remained healthy and resisted gingival implantation of fuso-spirochaetal organisms even when severe local trauma was induced simultaneously.—ALASTAIR N. WORDEN.

STRYKER, W. A., & JANOTA, M. (1941). **Vitamin A Deficiency and Intestinal Permeability to Bacteria and Toxin.**—*J. infect. Dis.* **69.** 243–247.

Of a group of 53 rats which were fed cultures of *Salmonella enteritidis*, 32 had been maintained on an A deficient diet and the other 21 received adequate A supplements. No *S. enteritidis* could be isolated from the viscera of 47 animals killed ½–24 hours after the organisms had been fed. In another group of 42 rats fed *botulinum* toxin, 23 had been given an A deficient diet, the other 19 receiving adequate A supplements. Serum from 30 of these animals, killed 6–24 hours after administration of the toxin, was injected into mice to determine whether the toxin had permeated through the intestine of the rat and was present in the blood. Four mice injected with serum from the A deficient rats died, and two injected with serum from the A supplemented rats died. Twelve rats of this group (nine on the A deficient diet and three on the adequate control diet) died before they could be killed. Mice injected with serum from all 12 animals died. While these results are not as conclusive as those obtained from the *S. enteritidis* experiment, all the evidence indicates that a vitamin A deficiency does not increase the permeability of the intestine to bacteria and toxin.—R. ALLCROFT.

HOLLAND, V. B., SATTERFIELD, G. H., GAUGER, H. C., HOLMES, A. D., & TRIPP, F. (1941). **The Vitamin A Reserve of Diseased Fowls.**—*Poult. Sci.* **20.** 543–550.
Assays were made of the carotene and vitamin A content of the livers of 85 diseased fowls of various breeds, ages, and sexes, which had been maintained under a wide variety of feeding and management conditions. With the exception of vitamin A deficiency the variation in the content of vitamin or provitamin in birds affected with the same disease was very great. No correlation existed between vitamin A reserves and any specific disease.—F. D. ASPLIN.

SMITH, S. E. (1941). **Vitamin A Deficiency in Silver Foxes.**—*Amer. Fur Breed.* **14.** No. 3. 10–12.
Six silver fox pups, the progeny of vixens given a vitamin A deficient diet during the suckling period, were provided with a vitamin A deficient diet from six weeks of age. They grew normally but exhibited peculiar head tremblings, either circling movements or periodic coma, and, in three cases, bilateral xerophthalmia with subsequent corneal ulceration. Epithelial keratinization occurred in various tissues. One young vixen of this batch which was successfully mated aborted at the 43rd day.—ALASTAIR N. WORDEN.

MCELROY, L. W., SALOMON, K., FIGGE, F. H. J., & COWGILL, G. R. (1941). **On the Porphyrin Nature of the Fluorescent "Blood Caked" Whiskers of Pantothenic Acid Deficient Rats.**—*Science.* **94.** 467.
Evidence is given that the red deposit which occurs around the nose and on the whiskers of rats deficient in pantothenic acid [see UNNA—*V. B.* **11.** 629.] is not blood but coproporphyrin which is derived from the Harderian gland. CHICK *et al.* [*V. B.* **10.** 956.] identified the material as protoporphyrin, but the data presented here indicate that it is coproporphyrin.—R. A.

SWALE, F. S. (1941). **Case Report of a Dietary Disorder Resulting in Vitamin B_1 Deficiency.**—*Amer. Fur Breed.* **14.** No. 5. 20.
"Chastek paralysis" was diagnosed in a group of young mink [see *V. B.* **11.** 892]. The symptoms, which developed shortly after the introduction of 25% fish trimmings (heads, tails, etc.) into the ration, comprised anorexia, weakness and partial paralysis of the hind limbs, and several kits died. The remaining animals recovered on removal of the fish trimmings from the diet and on treatment with vitamin B_1.—A. N. WORDEN.

HEATH, M. K., MACQUEEN, J. W., & SPIES, T. D. (1940). **Feline Pellagra.**—*Science.* **92.** 514.
Evidence is given of a deficiency disease in six cats in which the animals lost weight, refused food, and were weak and apathetic. Oral lesions observed were an ulcerated, reddish margin in the upper part of the palate close to the midline and a very red tongue sometimes congested and ulcerated, with thick, foul smelling saliva; a rise in temperature of 3–5 degrees occurred. Forty-eight hours after administration of nicotinic acid, there was a return of appetite, subsidence of symptoms, and disappearance of oral lesions.—R. ALLCROFT.

DAMESHEK, W., & MYERSON, P. G. (1940). **"Pigeon Dermatitis", a Vitamin B Deficiency State with Anemia.**—*Amer. J. med. Sci.* **199.** 518–539.
White King pigeons fed on a diet of polished rice and water developed beri-beri within 2–4 weeks; with a similar diet plus daily parenteral injections of thiamin such pigeons developed B_2 complex deficiency in 4–12 weeks. Neither the resultant anaemia nor dermatitis responded to the administration of riboflavin, nicotinic acid, rat antidermatitis factor, or the filtrate factor of Lepkovsky. Marked recovery followed parenteral administration of dilute liver extract and B_2 complex, and of yeast concentrate by mouth.

Injection of purified chick antidermatitis factor into two deficient pigeons resulted in a reticulocyte response but there was no clinical improvement. The authors point out that it is hazardous to compare deficiencies of one species with those of another, but suggest a possible relationship between pigeon dermatitis and pernicious anaemia in human beings.—F. D. ASPLIN.

PHYSIOLOGY

WATSON, R. H. (1941). **Studies on Deglutition in Sheep: A Résumé of Observations on the Course Taken by Liquids through the Stomach of Sheep at Various Ages from Birth to Four Years.**—*Aust. vet. J.* **17.** 52–58.
The course taken by liquids was followed by using a barium sulphate + gum acacia suspension and X-ray examinations. The observations may be summarized as follows. For the greater part of the period during which lambs suck the ewe, the milk taken passes to the abomasum, with very few exceptions. The passage to the abomasum of the milk is the result of the activation of a pattern of behaviour of which eagerness and the efficiency of the act of feeding form an essential part. The temperature and composition of suspensions sucked by lambs had no influence on passage to the abomasum nor had the posture assumed by the animal while sucking, nor the act of sucking itself. From the time when the lamb first begins to drink water spontaneously to quench thirst, usually all of it passes to the rumen and this passage is also independent of the temperature of the water and of the posture of the animal. The passage of milk and water to the abomasum and rumen respectively is determined by distinct behaviour patterns. The course taken by liquid when given as a drench varies largely with individual sheep. In some sheep at least up to the age of four years, barium sulphate suspension in whole or in part always passes to the abomasum, in other sheep it often passes there, while in still others it rarely does so. Passage to the abomasum is the result of reflex response of the oesophageal groove mechanism to the mechanical, and possibly chemical, stimulation of regions of the mouth or the pharynx, or both. The course taken by liquid given as a drench was little

influenced by its temperature, by the state of hunger and thirst of the animal, by giving the drench to the animal turned on its back, or by delivering the fluid much faster and under greater pressure. There is little change with increasing age of the animal up to four years in the efficiency of the mechanism which provides for the passage of liquid direct to the abomasum.

—H. McL. Gordon.

*Landsberg, J. W. (1940). Das Blutbild normaler Katzen. **[The Blood Picture of the Normal Cat].**—*Folia haemat., Lpz.* **64.** 169–173. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 75].

Investigations were carried out on 52 healthy adult cats and the following mean values obtained :–erythrocytes $7{\cdot}23 \times 10^6$, haemoglobin 10·49 g./100 ml., leucocytes 8,300–35,250, neutrophiles 59·3% (0–6% myelocytes and 0–16% metamyelocytes), eosinophiles 6·9%, lymphocytes 33%, and monocytes 0·8%.

No significant difference in the data obtained from male and female cats could be established.—F. A.

Addis, M. (1939). L'asportazione della mammella nella pecora, non influisce sul concepimento, sulla gravidanza e sull' involuzione uterina. **[Results of Removal of the Udder on the Genital System of Ewes].**—*Profilassi.* **12.** 169–172. [German summary].

A. made observations over a period of three years on ewes from which the udders had been removed because of gangrenous mastitis and on two-month-old lambs on which the same operation had been performed. He found that oestrus, gestation, and parturition were normal in all these animals.—Miller Watson.

Eden, A. (1941). **Blood Copper of Ewes during Pregnancy.**—*Biochem. J.* **35.** 813–815.

Blood Cu and haemoglobin estimations were made at monthly intervals on 21 pregnant ewes. Although individual variation was considerable the values all fell within the normal range of variations previously reported for non-pregnant sheep [see *V. B.* **12.** 116]. The results therefore do not support the view that the level of blood Cu is raised in sheep during pregnancy. Haemoglobin values were normal, and no correlation was found between haemoglobin and Cu levels.

—J. P. Gardner.

*Hortsmann, F. (1939). Ueber den Einfluss von Kupfersalzen auf den Milchsäurespiegel des Blutes bei Schafen. **[Influence of Copper Salts on the Blood Lactic Acid of Sheep].**—*Inaug. Diss., Berlin.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* June 20th. 305. (1941)].

A study was made of the effects of the administration of copper salts on carbohydrate metabolism in sheep by the measurement of the changes in the blood lactic acid picture. The Cu was given in the form of solutions of sulphate, gluconate, lactate, and citrate, administered orally, intraperitoneally, or intravenously. The intravenous injections were the most effective.

It was observed that the increase of blood Cu was associated with a fall in blood lactic acid and H. suggests that this indicates that there is a mechanism for the storing of Cu in the blood. [There appears to be no definite evidence for this suggestion.—Ed.]

—F. Aylward.

Rosenberg, L. E. (1941). **Microanatomy of the Duodenum of the Turkey.**—*Hilgardia.* **13.** 625–643.

After a short review of the gross structure, R. discusses in detail the histological elements of the duodenum of the turkey, both in its particular features and as compared with the mammal. In the main the structures are similar, although the following differences are noted. Well developed, regularly placed villi, the absence of Brunner glands, a poorly developed submucosa, and an extra layer of muscle adjacent to the muscularis mucosae. Emphasis is laid on the origin and morphology of cells, and the points outlined should prove of value to the avian pathologist and physiologist.—C. W. Ottaway.

Folley, S. J. (1941). **Parathyroid Glands and Lactation in the Rat. [Correspondence].**—*Nature, Lond.* **147.** 744.

Removal of the thyroid and parathyroids in lactating rats leads to a suppression of lactation and the animals fail to rear their young. The administration of large doses of parathormone to such animals produces a marked improvement in lactation which is still, however, below normal. F. concludes that the parathyroids are essential for normal lactation.—J. M. Robson.

Korenchevsky, V., & Hall, K. (1941). **Correlation between Sex Hormones, Thyroid Hormones and Desoxycorticosterone as Judged by their Effects on the Weights of Organs of Gonadectomized Rats.**—*Biochem. J.* **35.** 726–735.

The effects of administration of thyroid powder, desoxycorticosterone, oestradiol, androsterone and testosterone propionate given alone or in various combinations, on the weight of the organs of castrated male and female rats were determined. Various synergistic and antagonistic actions were observed which support the view that a correlation exists between the endocrine secretions of the adrenal, thyroid, and sex glands.

—J. M. Robson.

Gardner, W. V. (1941). **Inhibition of Mammary Growth by Large Amounts of Estrogen.**—*Endocrinology.* **28.** 53–61.

Administration of oestrogen inhibits the growth of the mammary gland in mice ; inhibition was nearly complete in mice receiving weekly injections of 50 μg. of oestradiol dipropionate. Inhibition of mammary growth was also produced by the administration of oestrogen to female and male monkeys and to female dogs. In oestrogen-treated male mice of the C3H strain, in which the females are susceptible to mammary tumours, the highest incidence of mammary tumours occurred in the group receiving doses permitting the more extensive mammary growth.—J. M. Robson.

POISONS AND POISONING

Richardson, T. J. (1941). **Sodium Chloride Poisoning in Fowls.**—*Vet. Rec.* **53.** 699–700.

R. records the deaths of ten of 63 Rhode Island Red fowls of various ages, as a result of their being fed a mash known to contain highly salted household swill. Symptoms were malaise and excessive thirst. On P.M. examination of three birds "dark" liver and slight catarrhal inflammation of the alimentary tract were noted.—F. D. Asplin.

Macgregor, R. (1941). **Peculiar Symptoms of Arsenical Poisoning in Buffaloes.**—*Vet. Rec.* **53.** 684.

The death was reported of two buffaloes which appeared to have died as a result of arsenical poisoning due to ingestion of a rat poison which contained 56% sodium arsenite ; haemorrhagic dermatitis was observed in both these cases with other P.M. evidence of arsenical poisoning. In order to investigate further the effect of sodium arsenite on buffaloes two experimental animals

weighing 500 and 1,200 lb. each were given 90 and 180 grains respectively of the rat poison; two others also weighing 500 and 1,200 lb. each were given 90 and 180 grains respectively of commercial sodium arsenite. The symptoms in all four cases were similar, *viz*, profuse salivation, cessation of feeding and rumination, and extensive haemorrhagic dermatitis. The two buffaloes which received the rat poison recovered, but the two given sodium arsenite died 40 and 50 hours respectively after administration of the poison. It appears then that the M.L.D. of sodium arsenite for buffaloes is about 60 grains per 400 lb. body weight and that haemorrhagic dermatitis is a fairly constant symptom of the poisoning in this animal.—R. ALLCROFT.

MOXON, A. L., & DUBOIS, K. P. (1939). **The Influence of Arsenic and Certain Other Elements on the Toxicity of Seleniferous Grains.**—*J. Nutrit.* **18.** 447–457.

Experiments in which rats were fed a diet containing 11 p.p.m. of selenium from seleniferous wheat showed that when 5 p.p.m. of arsenic as sodium arsenite was added to the drinking water the symptoms of Se poisoning were completely prevented; P.M. examination revealed no liver damage. Addition of 2½ p.p.m. As to the drinking water partially prevented the liver damage and those rats given As and a seleniferous diet consumed more food and grew more rapidly than those on a seleniferous diet without As. Tungsten added to the water at levels of 2½ and 5 p.p.m. appeared to reduce the mortality rate, and the higher level of tungsten reduced to some extent the liver damage caused by the seleniferous diet. Addition of 5 p.p.m. of fluorine, molybdenum, chromium, vanadium, cadmium, zinc, cobalt, nickel, and uranium to the drinking water of rats on the seleniferous diet caused an increase in the mortality.—R. ALLCROFT.

WALKER, O. J., HARRIS, W. E., & ROSSI, M. (1941). **Selenium in Soils, Grains, and Plants in Alberta.**—*Canad. J. Res.* Sect. B. **19.** 173–178.

The selenium content of samples of soils and of wheat varied from less than 0·1–1 p.p.m., while that of *Astragalus* plants varied from 0·3 p.p.m. in the root of one to 600 p.p.m. in the stalks of another. The majority of the wheat samples contained only traces and in no case could any be considered dangerous. Some of the soils contained over 0·5 p.p.m. Insufficient data are available to indicate the extent of these seleniferous areas, but it is believed that they may be smaller than was at first suspected. Dangerous areas are more likely to be present in the southern part of the province. The amount of Se absorbed by vetches is independent of the species and the Se content of the soil, and varies with the part of the plant examined.—R. GWATKIN.

I. MOLINA, R. R. (1940). **Experimental Liver Damage Associated with Hematologic Changes in Hogs.**—*Puerto Rico J. publ. Hlth.* **15.** 362–372.

II. MOLINA, R. R., & GONZÁLEZ, J. O. (1940). **Blood Studies in Normal Hogs.**—*Ibid.* 383–386.

I. Five litter-mate Berkshire pigs about three months of age at the commencement of the experiment, were dosed at intervals over a period of 2–4 months with varying amounts of carbon tetrachloride. The total amount given to any one animal varied from 380–737 ml. In three cases the dosage was such as to produce death in 8–17 weeks, and P.M. examination of these animals revealed that important pathological changes were limited to the liver, in which there was marked central haemorrhagic necrosis and evidence of biliary stasis.

The blood picture was followed in some detail, and it was found that spherical macrocytosis and polycythaemia were the most important changes accompanying the poisoning. As diarrhoea and vomiting were noted in the animals, the polycythaemia is attributed to haemoconcentration. The macrocytosis, which was in some cases accompanied by a fall in the erythrocyte count, is assumed to have resulted from a deficiency of the specific anti-anaemic factor due to an altered liver metabolism.

II. The results are reported of haematological examinations, conducted at weekly intervals for 22 and 25 weeks respectively, of two normal controls employed in the experiment described in I. Values are given for erythrocyte and reticulocyte counts, haemoglobin determinations, volume of packed red cells, mean corpuscular volume, mean corpuscular haemoglobin, leucocyte counts, and differential and plate counts.

—ALASTAIR N. WORDEN.

FOLSE, C. D. (1941). **Phenothiazine Poisoning.**—*Vet. Med.* **36.** 430–431.

Cases of phenothiazine poisoning previously reported in horses are discussed and it is suggested that when the diet has a high sugar content the toxicity of phenothiazine may be increased. The anaemia resulting from phenothiazine administration may be immediately corrected by blood transfusion. No original data are given.—R. ALLCROFT.

CRAWFORD, M. (1941). **Poisoning of Cattle by Artificial Manures.**—*Vet. Rec.* **53.** 650.

Sixteen cattle died a short time after grazing on an area which had been dressed the previous day with nitrate of soda. The symptoms observed were bloating, distress, severe purgation with, in some cases, eversion of the rectum and bleeding. P.M. examination indicated lesions of irritant poisoning, and on analysis the stomach contents gave a marked reaction for nitrates. In a discussion of the outbreak C. states that nitrate of soda is commonly used as a manure in Ceylon, yet no previous cases of poisoning by it have been reported. It is suggested that the combination of circumstances which brought about this incident were dry weather, the fact that a very short time elapsed between the manure being applied and the cattle being allowed to graze over the land, and the possibility that the cattle in this case had a definite craving for salt which led them to seek out and lick up the nitrate of soda on account of its salty taste.—N. J. SCORGIE.

*KOVÁCS, E. (1941). [**Toxicological Tests on Sweet Clover** (*Melilotus albus*)].—*Állatorv. Lapok.* 81. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 469].

A description of what appears to be typical "sweet clover disease", as seen in North America, occurring in cattle [presumably in Hungary] is followed by an experimental study wherein the incriminated sweet clover was fed to rabbits which died 16–31 days later after sustaining the typical haemorrhages.

The injurious factor was found to be present in watery, but not in alcoholic or ethereal extracts of the plant. Coumarin was also isolated, but did not alone reproduce the disease; it merely caused dilatation of the subcutaneous blood vessels. Rabbits succumbed after being fed for 6–7 days on sweet clover followed for two days by subcutaneous injections of 10% coumarin in oil. It is concluded that "sweet clover disease" is caused by two fractions of *Melilotus albus*, *viz*, coumarin and another unidentified substance which predisposes the animal to the action of coumarin. [See also *V. B.* **12.** 240.]

HUMPHREYS, F. A., & GIBBONS, R. J. (1941). **Deaths of Mink. Probably Paralytic Shell Fish Poisoning.**—*Canad. J. comp. Med.* **5.** 84–85.

Poisoning occurred in mink which were receiving a large quantity of fresh-water mussels (*Anodonta*

oregonensis). The onset was sudden, with severe convulsions, paralysis developing in the hindquarters and death occurring within a few hours. Autopsies proved negative. Transfer of spleen to a ferret showed no evidence of infection. An acid methyl alcohol extraction of the digestive glands of the mussels yielded less extract than is usual with salt-water mussels. Mice injected intraperitoneally with 40 and 20 mg. of dried extract died; 4 mg. produced no symptoms. This is believed to be the first time that paralysis due to poisoning by the fresh-water mussel has been demonstrated.
—R. GWATKIN.

THERAPEUTICS

SANDERS, D. A. (1941). **Iodized Mineral Oil as a Treatment for Bovine Mastitis.**—*Amer. J. vet. Res.* **2.** 407–410.

100–300 ml. of an iodized mineral oil, prepared by triturating resublimed iodine crystals with heavy liquid paraffin, were injected into the milk cistern *via* the teat canal of 17 cows affected with mastitis. Haemolytic streptococci had been isolated from one or more infected quarters of 12 cows, micrococci had been found in seven quarters of four cows, and staphylococci in one quarter of one cow. After injection the quarter was lightly massaged to facilitate distribution of the iodized mineral oil over the epithelial surface of the cistern. When 100 ml. were used the solution was allowed to remain in the udder overnight, but when a larger volume was used, the treated quarter was stripped thoroughly within 45 min. The injections caused a temporary inflammation of the udder tissues with the occurrence of erythrocytes in the fore milk and decreased milk flow in some cases. No permanent ill effects were observed in chronic cases, but one acute case of streptococcic mastitis appeared to be aggravated by the treatment. The organisms disappeared from the milk 1–7 days after treatment; subsequent microscopic examination of the milk was made in some cases for 3–8 weeks and no organisms were detected. It is concluded that these results indicate that chronic infections may be successfully treated with iodized mineral oil.—R. ALLCROFT.

I. HOTCHKISS, R. D., & DUBOS, R. J. (1941). **The Isolation of Bactericidal Substances from Cultures of Bacillus brevis.**—*J. biol. Chem.* **141.** 155–162.
II. LIPMANN, F., HOTCHKISS, R. D., & DUBOS, R. J. (1941). **The Occurrence of *d*-Amino Acids in Gramicidin and Tyrocidine.**—*Ibid.* 163–169.
III. HOTCHKISS, R. D. (1941). **The Chemical Nature of Gramicidin and Tyrocidine.**—*Ibid.* 171–185.
IV. CHRISTENSEN, H. N., EDWARDS, R. R., & PIERSMA, H. D. (1941). **The Composition of Gramicidin and Tyrocidine.**—*Ibid.* 187–195.
V. TISHLER, M., STOKES, J. L., TRENNER, N. R., & CONN, J. B. (1941). **Some Properties of Gramicidin.**—*Ibid.* 197–206.

I. Further details are given of the isolation and preparation of gramicidin and tyrocidine hydrochloride from peptone cultures of *B. brevis*. The properties and composition of the purified substances are discussed and it is shown that gramicidin is identical with the substance isolated by HOOGERHEIDE [*V. B.* **12.** R_1–R_6].

II. The results of oxidation of gramicidin and tyrocidine hydrolysates with *d*-amino acid oxidase indicate that of the α-amino acids which compose the polypeptide, 45% are present in the *d* form in gramicidin while in tyrocidine about 20% of its α-amino acids are of the *d* form.

III. Further studies of the chemical properties of gramicidin and tyrocidine indicate that gramicidin is a polypeptide which contains no free amino or carboxyl groups. The total N and O content is accounted for by α-amino acids (some of which have been identified as *l*-tryptophane, *d*-leucine, and alanine) and a 1, 2-aminohydroxy compound which is not an α-amino acid. Several empirical formulae can be prepared for gramicidin, but two satisfactory ones corresponding to molecular weights of 1054 and 1413 are discussed.

Tyrocidine appears to be a polypeptide of about 20 amino acid residues, including tryptophane, tyrosine, aspartic acid and dicarboxylic-amino acids, and having free basic amino groups. The most probable molecular unit has two amino groups, three amide groups, and one weakly acidic carboxyl or phenolic group and a mol. wt. of 2534.

IV. Evidence is presented which shows that the chemical nature and composition of gramicidin and tyrocidine are essentially those indicated by the data of HOTCHKISS [see III above]. It is suggested that the mol. wt. of gramicidin is a multiple of about 575 and that tyrocidine has a minimum mol. wt. of about 2700.

V. Investigation of the properties of gramicidin indicate that it is identical with the substance isolated by HOOGERHEIDE [see I above]. A crystalline flavinate and a rufinate of gramicidin were formed. The mol. wt. of gramicidin appears to depend on the nature of the solvent and the concentration of the solute. Cryoscopic determinations in cyclohexanone gave values from 600 to 1200, and isothermal distillation in methanol, a value of about 3100.—R. ALLCROFT.

OXFORD, A. E., & RAISTRICK, H. (1942). **Anti-Bacterial Substances from Moulds. Part IV. Spinulosin and Fumigatin, Metabolic Products of *Penicillium spinulosum* Thom and *Aspergillus fumigatus* Fresenius.**—*Chem. Indust.* **61.** 128–129. [For previous parts, see *V. B.* **12.** 308].

Spinulosin was first isolated (1931) from laboratory cultures of *P. spinulosum* and shown (1938) to be 3 : 6-dihydroxy-4-methoxy-2 : 5-toluquinone. Fumigatin was isolated from the metabolism solution of cultures of a strain of *A. fumigatus* and its molecular structure proved to be 3-hydroxy-4-methoxy-2 : 5-toluquinone. A different strain of *A. fumigatus* failed to produce fumigatin but gave a fair yield of spinulosin. Data are given of the antibacterial activity of the two substances against a number of pathogenic bacteria. The method of testing was the same as that described in part III of this series, and *p*-benzoquinone was again used as a reference substance for comparison of activity. The results indicate that fumigatin has a strong antibacterial action against *Vibrio cholerae*, *Bacillus anthracis*, and certain strains of *Staphylococcus aureus*, but that spinulosin is a relatively weak antibacterial agent. This shows that the introduction of a hydroxyl group into the fumigatin molecule very markedly decreases the antibacterial activity. Growth of *B. anthracis* and of some strains of *Staph. aureus* was completely inhibited by fumigatin at dilutions of 1 : 50,000 and of *V. cholerae* at 1 : 100,000. Fumigatin was much more effective against *Staph. aureus* than either *p*-benzoquinone or spinulosin, but dilute aqueous solutions of this substance deteriorate on standing.—R. ALLCROFT.

ORDAL, E. J., WILSON, J. L., & BORG, A. F. (1941). **Studies on the Action of Wetting Agents on Micro-organisms. I. The Effect of pH and Wetting Agents on the Germicidal Action of Phenolic Compounds.**—*J. Bact.* **42.** 117–126.

In studies on the effect of wetting agents on the germicidal activity of phenol upon *Staphylococcus aureus*, it was found that undissociated phenol was more toxic than sodium phenolate. The addition of various wetting agents to suitably buffered phenolic compounds generally increased their germicidal activity, this effect depending both upon the nature and the concentration of the wetting agent. The germicidal activity at a given pH of solutions containing buffer, phenol, and wetting agent was greater than with buffer and phenol or buffer and wetting agent. This germicidal activity of the mixed buffer, phenol, and wetting agent decreased with increasing alkalinity over the pH range 9–11. The germicidal efficiency of buffer plus wetting agent, on the contrary, increased over this range. These facts suggest that the presence of the wetting agent improved the efficiency of undissociated phenol to a greater extent than that of the dissociated phenolate.—ALFRED EDEN.

DANN, L., GLÜCKSMANN, A., & TANSLEY, K. (1942). **Experimental Wounds Treated with Cod-Liver Oil and Related Substances.**—*Lancet.* **242.** 95–98.

The effects of the following substances on the healing of standard experimental wounds in rats [see also *V. B.* **12.** 304.] were investigated :– cod liver oil, two of its fractions separable by distillation, vitamin A (as naphthoate and in coconut oil), arachis oil, peroxidized arachis oil, linoleic acid, methyl linoleate, coconut oil, and liquid paraffin. Collagen regeneration was stimulated to a varying degree by all the substances tested. Epithelial regeneration was promoted by linoleic acid only ; it was delayed by all the other substances tested with the exception of liquid paraffin and of one of the two samples of cod liver oil tested ; the other sample of cod liver oil caused a slight delay in epithelial regeneration.—J. M. ROBSON.

RUBBO, S. D., & GILLESPIE, J. M. (1942). **Mode of Action of Sulphonamides in vitro.**—*Lancet.* **242.** 36–38.

P-aminobenzoic acid is a growth factor essential for the growth of *Clostridium acetobutylicum* (W.). The growth of this organism *in vitro* is inhibited in the presence of sulphonamides (sulphanilamide, sulphapyridine, soluseptasine, and proseptasine). The bacteriostatic action of the sulphonamides is removed by increasing the concentration of *p*-aminobenzoic acid 10–100 times above the amount necessary to promote growth. One part by weight of *p*-aminobenzoic acid reverses the bacteriostatic action produced by 26,000 parts by weight of sulphanilamide.—J. M. ROBSON.

I. BRYAN, A. H. (1941). **Sulfanilamide Therapy in Enterohepatitis (Blackhead) of Turkeys.**—*N. Amer. Vet.* **22.** 486–487.

II. MCCULLOCH, E. C., & NICHOLSON, L. G. (1941). **Mapharsen Therapy in Enterohepatitis of Turkeys.**—*Vet. Med.* **36.** 574–576.

I. A report on the apparently successful use of sulphanilamide therapy in blackhead in a small flock of turkeys. Large doses of the drug were given, *viz*, 2 grains per lb. body weight twice daily for five days, then 0·5 grains per bird daily for the next week. The drug was suspended in water and injected [? *per* cloaca] into the cæca by means of a syringe with attached hard-rubber nozzle. Recovery is stated to have been complete within one or two weeks.

II. During a severe outbreak of blackhead in a flock of turkeys, 27 poults weighing 8–12 lb., and showing clinical evidence of blackhead, were given intramuscularly 0·005 g. mapharsen (a drug containing 29% trivalent As). Seven birds made complete clinical recoveries. One of these birds which was later submitted to P.M. examination showed lymphomatous-like tumours in the liver, which are apparently associated with the healing of blackhead lesions.

The toxicity of mapharsen was tested on four cockerels. Intramuscular injection of 0·00474–0·01076g. per kg. was without deleterious effect. Injection of 0·0143 g. per kg. produced severe dyspnoea and weakness within 5 min. One bird given mapharsen at the rate of 0·0208 g. per kg. died between the 10th and 17th hour. In view of the low toxicity of the drug the authors recommend its use on all exposed birds as soon as blackhead has been diagnosed in a flock.—N. J. S.

PERSHIN, G. N. (1939). O kumulyativnykh svoïstvakh piroplazmina. **[Cumulative Effect of Piroplasmin].**—*Sovyet. Vet.* No. 8. pp. 50–51.

In view of the repeated reports of hypersensitivity of some animals to repeated injection of piroplasmin [Russian equivalent to German acaprin], daily injections were given to 10 dogs, 40 white mice, 5 cats, and 5 rabbits.

When doses of 1·0 and 0·5 mg. per kg. body weight were used for dogs, no cumulative effects were observed. With sublethal daily doses of 2 mg. per kg., death occurred after five days. Similar results were obtained in other laboratory animals. It is concluded that repeated injections within the therapeutic limits may safely be made in practice.—A. MOLDAWSKY.

KORNIENKO, Z. P., POGORZHEL'SKAYA, V. M., & KORNIENKO, A. M. (1939). O vozmozhnosti zabolevaniya loshadeï piroplazmozom v period obrabotki ikh mysh'yakovistymi rastvorami. **[Arsenic as a Tick Repellent for Prophylaxis against Equine Piroplasmosis].**—*Sovyet. Vet.* No. 3. pp. 71–74.

The authors found in some experiments that the use of arsenic as a tick repellent did not prevent equine piroplasmosis from spreading from infected to "clean" horses.—A. MOLDAWSKY.

I. SCHMITZ. (1941). Erfahrungen über die Bekämpfung der Räude. **[Experiences in the Control of Mange in Horses].**—*Dtsch. tierärztl. Wschr.* **49.** 435–437.

II. LEONHARDT. (1941). Räudebehandlung mit französischen Gaszellen. **[Treatment of Equine Mange in French Gas Cells].**—*Ibid.* 437–438.

I. During the war of 1914–18 mange in horses was a most serious and widespread disease in the German armies. In the present war improved methods of control and treatment have so far been successful in limiting outbreaks and losses have been negligible. Horses can be returned to work in four weeks after treatment. S. describes cases admitted to a veterinary hospital in France in the winter of 1940–41. 90% were due to *Psoroptes* while only 10% were due to *Sarcoptes*. This is in direct contrast to the experience of the last war when sarcoptic mange was by far the commoner. [Possibly this partly explains the greater success in treatment.]

Treatment was by means of sulphur dioxide in gas cells, the construction of which is briefly described. Horses were given three one-hour exposures at weekly intervals. This was usually sufficient to produce a complete cure although sometimes four and rarely five treatments were required. The head was usually treated with odylen washes or occasionally with petrol. A few fatalities resulted from broncho-pneumonia caused by gas escaping round the collar and being inhaled.

II. L. describes the French type of gas cell for the treatment of mange in horses. The cells are constructed to take four horses at a time. Sulphur dioxide is prepared by burning stick sulphur (2–2·25 kg.) in an oven. No separate heating apparatus is used but the mixture

of hot SO_2 and air raises the temperature in the cell to the proper level. The gas is led in by a pipe opening under the roof; an outlet pipe near the floor leads the gases back into the oven, forming a closed circuit. The effective concentration is indicated by the extinguishing of a candle placed inside the cell and exposure is continued for one hour after this time.

Twenty-four horses can be dealt with in a day. The cells are easily dismantled and readily transportable. The burning of sulphur sticks avoids the use of sulphur dioxide cylinders which are less easy to transport and are liable to explode at summer temperatures. On the other hand the concentration of gas is less exact.

—H. E. HARBOUR.

GORDON, H. McL., & WHITTEN, L. K. (1941). **A Note on Variations in the Efficiency of the Copper Sulphate and Nicotine Sulphate Drench against** *Haemonchus contortus*.—*Aust. vet. J.* **17.** 172–177.

Observations showed that individual sheep may repeatedly fail to respond to treatment with copper and nicotine sulphate mixture against *H. contortus*. This explains those instances in which outbreaks of haemonchosis are not satisfactorily controlled by repeated drenching with this mixture. The reason for these repeated failures is not clear, but it is assumed to be the failure of the oesophageal groove to close in certain individuals. The practical significance of these findings is considerable. The authors stress the importance, in outbreaks of haemonchosis, of using carbon tetrachloride for any individuals which fail to respond to drenches which depend on copper sulphate to convey them direct to the abomasum. Carbon tetrachloride is effective whether swallowed into the abomasum or into the rumen. Its use as an alternating drench will prevent deaths of sheep which repeatedly fail to respond to copper sulphate mixtures. Even though such sheep may not succumb, they will, unless effectively treated, continue to contaminate pastures with eggs and so prolong the outbreak.

KAUZAL, G. P., & WHITTEN, L. K. (1941). **A Report on the Failure of Phenothiazine as an Anthelmintic against the Common Nematodes of Dogs in Australia.** —*Aust. vet. J.* **17.** 185–187.

In a number of trials employing 13 dogs, phenothiazine in single doses of 1–10 g. or repeated doses of 1–3 g. was erratic and generally unsatisfactory as an anthelmintic against ascarids; it was usually ineffective against *Ancylostoma* and was almost completely ineffective against *Trichuris*. It was ineffective against *Dipylidium* in the only dog infested with this tapeworm.

—H. McL. GORDON.

GORDON, H. McL. (1941). **The Use of Phenothiazine for the Control of Oesophagostomiasis (Nodule Worm Disease) of Sheep.**—*Aust. vet. J.* **17.** 166–172.

The geographical distribution of *O. columbianum* in eastern Australia is shown on a map. Epidemiology and control are discussed and illustrated in a diagram. Symptoms and diagnosis are briefly discussed. Infestations are usually acquired during late spring and summer, or early autumn in regions receiving a predominantly summer rainfall. Symptoms are usually not manifested until early winter, winter, or even early spring, but in young sheep symptoms may be severe by autumn. Affected sheep are debilitated and show a humped back and a characteristically stiff action of the hind legs, the tail is frequently held up at an angle from the body, and the faeces are soft, containing much mucus and sometimes streaks of blood. Faecal examinations may be misleading, as eggs appear to be passed irregularly owing to their aggregating in masses of mucus rather than mixing with the faeces. Rectal exploration may reveal nodules, but in young sheep nodules are often few or lacking.

Control measures are complicated by a number of special features. The effects of infestation may persist throughout the life of the sheep, the animal suffering when young from the effects of the adult worms, and later from the progressively increasing number of nodules. Hence treatment to destroy adult worms is not as valuable in oesophagostomiasis as in other ovine helminthiases. Attempts should be made to reduce considerably the degree of infestation and to maintain it at such a low level that nodule formation will not produce ill-effects. Once nodules are formed nothing can be done to remove them and adequate nutrition is the only useful measure one can then adopt. Treatment against adult worms must be highly efficient. Prior to the use of phenothiazine, enemas of sodium arsenite (2 grains per quart, with a 2-quart dose for grown sheep) represented the only highly efficient treatment. Treatment should be carried out in autumn, mid-winter, and late winter. Late winter treatment of ewes will reduce pasture contamination for spring lambs.

The administration of phenothiazine is discussed. Thick suspensions made by mixing equal quantities of the drug (mixed with dispersing and suspending agents, such as bentonite and wetting agents) and water can be administered through drenching syringes but not by automatic drenching guns. Precautions for minimizing staining of wool are briefly discussed.

LECOQ, R. (1941). Action des injections intraveineuses de gluconate de calcium sur la réserve alcaline et la calcémie. [**Action of Intravenous Injections of Calcium Gluconate on the Alkali Reserve and Blood Calcium**].—*C. R. Acad. Sci., Paris.* **212.** 314–316.

Although the antihaemorrhagic properties of calcium gluconate are easily explained as being due to increased blood Ca, the other effects (antitoxic action, etc.) which make it useful for pre- or post-operative treatment cannot be explained on this basis. Suggesting that these actions may be the result of an increase in the blood alkaline reserve, L. found that intravenous injection of 10 ml. of 10% solution into rabbits was followed by a slight rise in blood Ca and a marked increase in the blood alkaline reserve which reached a maximum value 24–48 hours after the injection.—J. G. CARR.

VÖHRINGER, K. (1941). Uebersicht über die Geschlechts-Hormonmittel und ihre Anwendung. [**Review of Sex Hormone Preparations and their Use**]. —*Berl. Münch. tierärztl. Wschr.* April 11th. 182–184.

A short descriptive list of the hormones contained in the anterior and posterior pituitary lobes, the ovary, and the testis is given and is followed by a list of certain commercial preparations available. [The article is incomplete, inaccurate, and misleading.]—J. M. ROBSON.

BIERI, F. J. (1941). Untersuchungen über die Wirksamkeit von Hormonpräparaten (Neo-Benzoestrol, Provetan, Prolan) bei Brunstlosigkeit von Kühen, Jungrindern und Schweinen. [**Efficacy of the Hormone Preparations (Neo-Benzoestrol, Provetan, Prolan) in Anoestrus in Cattle and Swine**].—*Schweiz. Arch. Tierheilk.* **83.** 359–368.

The best results were obtained with neo-benzoestrol (stilboestrol dipropionate) and with provetan (oestradiol benzoate). The administration of these preparations to pigs and cows during anoestrus induced oestrus in the majority of animals, and 58 out of 107 treated animals became pregnant. The best results were obtained in swine. In heifers the results were unsatisfactory.

—J. M. ROBSON.

PUBLIC HEALTH

I. —. (1941). **Survey of Milk Control, including the Extent of Pasteurization, in Municipalities of Two Thousand Population in Canada. Compiled by the Milk Committee of the Canadian Public Health Association.**—*Canad. publ. Hlth J.* **32.** 216–224.

II. —. (1941). **Survey of Milk-Borne Diseases in Canada. Compiled by the Milk Committee of the Canadian Public Health Association.**—*Ibid.* 225–226.

I. A tabulated statement showing data concerning the milk supply of 250 towns. The data given are:—population, whether a dairy farm licence is required, whether dairy farms are inspected, whether tuberculin testing of cattle is carried out, whether testing is done for bovine brucellosis, whether pasteurization is compulsory, the details of the law concerned where pasteurization is compulsory, the number of pasteurization plants serving the community, the number of raw milk dairies in the community, the amount of fluid milk supplied daily, the percentage pasteurized, and the number of dairy inspections made *per annum*.

II. Two tables showing the incidence of milk-borne diseases in Canada as recorded by provinces and municipalities from 1912–36 and from 1937–40.

From 1912–40 milk-borne infection in human beings in Canada was responsible for 7,145 cases of typhoid and paratyphoid fevers with 704 deaths, for 192 cases of scarlet fever with no deaths, for 636 cases of septic sore throat with 4 deaths, and for 1,319 cases of brucellosis with 10 deaths.

—. (1941). **A Proposed Standard Milk Ordinance.**—*Canad. publ. Hlth J.* **32.** 230.

The Canadian Public Health Association has prepared a standard milk ordinance for the consideration of Federal and provincial health authorities. The term "milk" is defined and is then differentiated from such products as chocolate dairy drink, made from skim milk.

—Chas. A. Mitchell.

Bahr, L. (1941). Sind männliche Ratten weniger empfänglich für Scillagift als weibliche Ratten? **[Are Male Rats Less Sensitive to Squill Poison than Female Rats?]**—*Dtsch. tierärztl. Wschr.* **49.** 575–577.

No difference in the sensitivity of male and female white rats to the lethal action of squill poison was found. Great individual variations were obtained both in white rats and in wild (brown) rats, the latter being much more sensitive to the poison than the former.—J. M. R.

TECHNIQUE AND APPARATUS

Wang, S. H. (1941). **A Direct Smear Method for Counting Microscopic Particles in Fluid Suspension.**—*J. Bact.* **42.** 297–319.

A detailed description is given of this convenient and relatively accurate counting technique. Any suspension containing 100,000–1,000,000 particles per ml. can be counted directly. An accurately measured drop is allowed to dry as a smear within a rectangular enamel frame on a clean glass slide, and the bacteria, blood corpuscles etc. are appropriately stained.

A square microscope field, which is accurately calibrated by means of an ocular micrometer, is obtained by the insertion in the ocular of the microscope of a paper diaphragm with a square hole.

A systematic examination of 50 fields is sufficient. The fullness of the description gives the reader every help in obtaining accurate results, and successful examples of its use are included, together with suggested applications and a review of past methods.—J. Keppie.

Thomassen, K. (1940). Om verdien av fluorescensmikroscopi til påvisning av tuberkelbaciller. **[On the Value of Fluorescence Microscopy in the Investigation of Tubercle Bacilli].**—*Nord. Med.* **8.** 1976–1980. [Abst. in *Tubercle, Lond.* **22.** 227, copied *verbatim*].

Thomassen records the results obtained by fluorescence microscopy and the ordinary Ziehl-Neelsen stain in 500 different specimens and compares them with the results obtained by cultures and inoculations of guinea-pigs. He also carried out experiments with progressive dilutions of pus or purulent urine. Microscopy [fluorescence] showed considerably better results than the ordinary microscopical examination both as regards the number of positive reactions and the time required for examination. Acid-fast bacilli of other kinds were found almost as frequently by this method as with the Ziehl-Neelsen stain. Positive results with fluoroscopy must therefore be regarded with caution, and cultures should not be omitted as they yield more certain and more frequent positive results.

Stockmayer, W. (1940). Zur Feststellung von Tuberkelbazillen in Ausscheidungsproben vom Rind. **[Demonstration of Tubercle Bacilli in Excretions of Cattle].**—*Z. InfektKr. Haustiere.* **57.** 75–84.

Out of 202 samples of bronchial mucus taken in duplicate from suspected cattle, 119 were positive for tubercle bacilli by microscopic examination whilst only 113 were positive by the antiformin method. Only six samples out of 83, negative on direct smear, became positive after antiformin "enrichment".

For the detection of tubercle bacilli in bulk milk samples, g. pigs were inoculated with a mixture of sediment and cream. It was found necessary to keep the g. pigs for eight weeks in order to obtain all the evidence of infection.

133 samples of bronchial mucus, 34 samples of uterine exudate, and 21 milk samples from individual cows were treated with a 15% HCl solution, centrifuged, and half of each sample sown on Petragnani-Witte medium, while the other half was inoculated subcutaneously into g. pigs. Cultural examination detected 75 cases of TB. and g. pig inoculation 80 cases. Both tests were of equal duration. S. concludes that animal inoculation for the detection of TB. from single samples of mucus and milk can be dispensed with in favour of cultural examination. The latter is used in Württemberg for all routine work, g. pig tests being reserved for exceptional cases. Microscopic examination of direct smears, treated or untreated, proved much less accurate than either of the other methods.—M. Landau.

Giroud, P., & Panthier, R. (1941). Essai pour la mise en évidence de l'état de vitalité de divers microbes. **[Demonstration of Vitality of Micro-Organisms].**—*C. R. Acad. Sci., Paris.* **212.** 253–255.

Rickettsia, un-named bacteria, and pleuro-pneumonia organisms were stained by Macchiavello's method for rickettsia (basic fuchsin, differentiating with citric acid, and counterstaining with methylene blue). When living organisms were used, they retained the fuchsin whereas fixed preparations or killed material did not. In cultures and in tissues, the number of organisms retaining the stain was an indication of the number of viable organisms.—J. G. Carr.

Vladesco, R. (1941). Nouvelle méthode pour la numération des globules rouges du sang. **[New Method for Erythrocyte Counts].**—*C. R. Acad. Sci., Paris.* **212.** 1051–1053.

A known volume of the blood diluted to 1% is centrifuged until the cells occupy a constant volume. The volume produced by 1 cu. mm. is divided by the average volume of the red blood cell of the species used. By centrifuging in capillary tubes, only a small volume of blood is needed. Because of their variable volume, leucocytes cannot be determined in this manner.

—J. G. CARR.

BLAIR, G. W. S., FOLLEY, S. J., MALPRESS, F. H., & COPPEN, F. M. V. (1941). **The Oestroscope: An Instrument for Detecting Oestrus in Cows.**—*Vet. Rec.* **53.** 693–694.

A description of a simple instrument for the measurement of a physical (rheological) property of the cervical mucus known as flow-elasticity. Directions are given for carrying out and interpreting the test. The authors have found that the flow-elasticity of cervical mucus varies regularly during the oestrus cycle and attains a sharp maximum about the time of heat. They consider that the test would be of practical value in determining heat in cows in which the external signs of oestrus are absent or slight.—N. J. SCORGIE.

MISCELLANEOUS

GRASSI, L. (1938). L'Istituto nelle persone e nelle opere. **[The Veterinary Research Institute of Sicily].** —*Azione vet.* **7.** 285–292.

The Veterinary Research Institute of Sicily was founded in 1930. District veterinary officers have the use of the institute's facilities. General practitioners are invited to lectures and demonstrations, and scholarships are granted to practitioners in order that they may spend a year in the institute. Refresher courses for veterinarians are a regular part of the institute's work.

No details of laboratory work are given.—M. WATSON.

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1941). **Colonial Development Advisory Committee. Eleventh and Final Report covering the Period 1st April, 1939–17th July, 1940.** pp. 16. London: H.M. Stat. Off. [8vo] [3d.]

This report discusses the effect of the war on the committee's grant and loan policy and gives a résumé of 11 years' work which has been brought to an end by the Colonial Development and Welfare Act of 1940. The Colonial Development Fund was limited to £1,000,000 a year; under the new arrangements, provision of assistance to colonial governments is provided up to a maximum of £5,000,000 a year for ten years for development and welfare work, together with a separate sum for colonial research up to a maximum of £500,000 a year.

Details of individual grants and loans are included in part III of the report, but this has not been printed.

—J. E.

GREAT BRITAIN. (1938). **Annual Report of the Hannah Dairy Research Institute, for the year ending 31st March, 1938.** [WRIGHT, N. C.]. pp. 27. Kirkhill, Ayr: Hannah Dairy Research Institute. [8vo].

In the general review of past work reference is made to veterinary activities including the control of TUBERCULOSIS, CONTAGIOUS ABORTION, and MASTITIS in herds of the neighbourhood, a survey on calf diseases, and notes on diagnostic and advisory work.

In the research section some progress and some loss of ground is reported in the control of CONTAGIOUS ABORTION in selected herds. Work on MASTITIS was devoted to control in individual herds, the introduction of a simple diagnostic test [see *V. B.* **10.** 229 and 573.], and chemotherapy. Work on bovine TUBERCULOSIS was limited to a study of its pathogenesis in calves fed on infected milk.—J. E.

I. GREAT BRITAIN. (1939). **The Edinburgh and East of Scotland College of Agriculture. Report on the Work of the College for the Year ending 30th September 1939.** pp. 67. Edinburgh: The College. [8vo].

II. GREAT BRITAIN. (1940). **The Edinburgh and East of Scotland College of Agriculture. Report on the Work of the College for the Year ending 30th September, 1940.** pp. 43. Edinburgh: The College. [8vo].

I. An investigation into MASTITIS was begun and nearly 400 cows in eight herds were examined for infection by streptococci, results being given in two tables. Streptococci of group I preponderated heavily over those of groups II and III and some herds were heavily infected. It is stated that more positive results were obtained by plating than by Edwards' liquid medium. In a few infected cows given udder infusions of acriflavine, the results were only moderately good.

II. Fourteen herds were under supervision for the control of MASTITIS by regular testing and segregation. A table shows the number of cases of new infection in each herd at four successive quarterly tests. Of 34 treated perorally with sulphanilamide, five became free from infection, and of 20 treated with acriflavine udder infusions, five also were cured.

Further experiments with the plate method and Edwards' medium modified so as to contain half the amounts of crystal violet and sodium azide gave results in favour of the former method.—J. E.

SUDAN. (1940). **Annual Report of the Sudan Veterinary Service, 1939.** [WILLIAMS, H. B.] pp. 40. [fcp] [Mimeographed].

ANIMAL DISEASES.—All common diseases were kept under adequate control, incidence being widespread but casualties light. Nearly 18,000 privately owned camels were treated, on payment, for TRYPANOSOMIASIS with naganol. Not a single case of RINDERPEST or FOOT AND MOUTH DISEASE occurred in any export quarantine park, and BOVINE CONTAGIOUS PLEURO-PNEUMONIA cases were rare. Of 953 horses and mules vaccinated with neuro-vaccine against HORSE SICKNESS, only five subsequently died of the disease.

ANIMAL INDUSTRY.—Export trade in all animal products was at first slow, but it revived in the last few months. Final export valuations were:—cattle, 8,057 valued at £E.33,987 as against 7,256 and £E.33,550 in 1938; sheep 15,377 and £E.13,680 as against 1,840 and £E.1,846 in 1938; camels 17,187 and £E.80,000 (estimated) as against 19,195 and £E.90,000; hides, 1,160 metric tons and £E.43,273 as against 1,321 tons and £E.59,346; sheepskins 882 tons and £E.48,151 as against 790 tons and £E.38,281; goatskins 186 tons and £E.16,033 as against 105 tons and £E.7,000; clarified butter 725 tons and £E.36,470 as against 590 tons and £E.33,000. Egypt was the largest buyer of all products except sheepskins, most of which go to the U.S.A. About 2,000 camels, 20,000 cattle, and 200,000 sheep and goats were slaughtered in "ten large towns" representing probably about 75% of total abattoir slaughterings.

LIVESTOCK IMPROVEMENT.—The policy continues of breeding up from indigenous types rather than of importing sires. No bulls have been imported for many years, and most of the 18 imported Arab sires will ultimately be replaced by locally bred stallions.

EDUCATION.—The course of professional instruction for Sudanese at the Khartoum Veterinary School continues.—S. C. J. BENNETT.

SUDAN. (1940). **Annual Report of the Senior [Veterinary] Research Officer, 1939.** [BENNETT, S. C. J.]—*Rep. Sudan vet. Serv., 1939.* pp. 30–40.

GENERAL.—The volume of usual routine duties rose in the case of every item and the staff was fully occupied in coping with demands. No new activities were undertaken. Research again remained in abeyance, but three small *ad hoc* series of observations were carried out.

ROUTINE.—Work was done mainly on the preparation and issue of biological products for field use. Issues of naganol for the treatment of camel TRYPANOSOMIASIS rose from 14,748 to 17,783 doses, and those of diagnostic materials (for the mercuric chloride test) rose in proportion. Issues for the treatment on payment of privately owned camels accounted for most of this, and more would have been issued had not the outbreak of war prevented the delivery of stocks on order from Germany. Towards the end of the year stocks of British-made antrypol were received, and this drug proved satisfactory. Just over 113,000 doses each of 50 ml. (total 5,660 litres) of RINDERPEST serum, and nearly 165,000 doses each of 10 ml. of rinderpest vaccine were prepared. It was again difficult to obtain suitable cattle for serum production. The addition of acriflavine 1 : 50,000 to the usual 0·5% carbolic acid as a serum preservative was highly successful, resulting in a product that remained almost completely sterile. About 3,000 doses of virus were issued for serum-virus immunization. Only a little over 30,000 doses of BOVINE CONTAGIOUS PLEURO-PNEUMONIA vaccine were issued, the smaller demand being apparently due to lower incidence following widespread vaccination. About 10,000 doses of FOOT AND MOUTH DISEASE virus were issued for infection of cattle destined for export [see also *V. B.* **10.** 400.] and 983 doses of HORSE SICKNESS vaccine, received from Kenya in bulk, were distributed. Few of the specimens received for diagnosis were of unusual interest, but they included cases of CRYPTOCOCCUS CONJUNCTIVITIS which is fairly common in the Sudan, of *Trypanosoma uniforme* infection and BLACKLEG (the first cases seen in the country) and a case of bovine TUBERCULOSIS (which is exceedingly rare).

RESEARCH.—Comparison was made between German-made naganol and British-made antrypol, which are said to be chemically identical. The drugs behaved identically when camels infected with *Tryp. evansi*, either naturally or artificially, were treated.

The importation of camels into neighbouring countries is sometimes prohibited on account of FOOT AND MOUTH DISEASE, since there has hitherto been no agreement as to susceptibility. Ten camels were tested, none of which developed any symptoms even when virus was injected into the epithelium of the tongue or at the junction of the toe-nail and the skin.

Owing to the appearance of atypical lesions in horses dying of apparent HORSE SICKNESS after vaccination, the existence of some other disease with somewhat similar symptoms was suspected. Five supposedly clean horses were injected with various samples of suspected blood, but none developed any symptoms. Unfortunately no known horse-sickness virus was available for susceptibility check tests, so the question still remains open.

UNITED STATES OF AMERICA. (1940). **Report of the Chief of the Bureau of Animal Industry, 1940.** [MOHLER, J. R.] pp. 90. Washington, D.C.: United States Department of Agriculture. [8vo] [10 cents].

The general scope of activities of the Bureau is reviewed. The staff numbered 4,416 regular civil service employees and of these 2,141 were in the professional and scientific service, about 93% being veterinarians. Expenditure amounted to over £4,000,000. During the year 480 students graduated from the ten accredited veterinary colleges.

ANIMAL DISEASE STATION [EICHHORN, A.]—All antigen used in the Federal and state co-operative control of BRUCELLOSIS is prepared by the station (8½ million tests). The results of calfhood vaccination with strain 19 of *Br. abortus* show that less than 2% of the animals aborted [see also *V. B.* **11.** 841–846]. Testing commercial vaccines has reduced the number of unsatisfactory vaccines presented for test to 7·2% of the samples received in 1939–40, as compared to 40% in 1937–38. Further data were obtained on the dissociation of S colonies of *Br. abortus* into R and intermediate colony types. Through changes in the medium, the S might be dissociated into R or intermediate forms and certain dissociants might be maintained as such or revert to the S type. The R dissociants of the genus *Brucella* exhibit a specific antigenicity distinct from that exhibited by the S type. The necessity for the control of commercial vaccines is apparent.

In an experimental exposure for nine months of ten non-tuberculin reacting heifers to possible TUBERCULOSIS infection by contact with 26 tuberculin reactor cows which had ceased to react, none of the exposed animals showed a positive reaction during the test period. Exposure of 50 chickens and 31 pigs to contact with 50 tuberculous chickens for a year, caused 54% of the chickens and 93·5% of the pigs to become positive reactors to avian tuberculin.

Sanitary measures alone proved of considerable value in bovine MASTITIS control, there being 5·8% new infections in a herd so dealt with as compared with 21·4% new infections in a herd where few sanitary precautions were taken.

Serial passage of leucotic blood through young chicks reduced the incubation period and course of LEUCOSIS from an average of 80 days in the first passage to 17·8 days in the 16th passage. The leucosis virus was also successfully passaged through the chick embryo.

Disinfection of hides infected with the virus of VESICULAR STOMATITIS was effective without injury to the leather when the hides were soaked in a 1 : 10,000 solution of sodium bifluoride or sodium silicofluoride for 24 hours. The virus in g. pig pads, dried and preserved *in vacuo*, was found to be still viable after 18 months.

ANIMAL HUSBANDRY AND ANIMAL NUTRITION DIVISIONS [MCPHEE, H. C., & HOWE, P. E.]—Studies on the reproductive cycle of fur animals were continued, particularly on the induction and development of pseudo-pregnancy, the relation of ovulation to copulation, gestation periods, and the role of hormones in ovulation. Ovulation in mink occurs 42–52 hours after copulation.

Preliminary tests showed that adult fur animals store sufficient vitamins A and D for the summer when fed diets rich in these during the spring. Foxes deficient in vitamin A showed peculiar "head cockings" and retractions and a characteristic whirling in a circle when excited. Preliminary observations showed that search for cornified vaginal smears and possibly cornified nasal smears may be a useful clinical method of detecting vitamin A deficiency in both male and female fur animals. Acute RICKETS developed in fox pups fed a

vitamin D free diet low in calcium and having an unfavourable Ca : P ratio. Fox pups and mink kits transferred to a vitamin D free diet containing adequate Ca and P in a ratio of 2 : 1, and housed away from sunlight, developed normally. CANNIBALISM in artificially raised quail was checked by the addition of 2% of common salt to the diet.

BIOCHEMICAL DIVISION [CHAPIN, H. M., & HENLEY, R. R.]—The addition of zinc sulphate to malate media increases the quantity and uniformity of yield of culture of human type tubercle bacilli. A new medium developed for *Salmonella pullorum* gives three times the growth of standard medium [no details given]. SWINE FEVER investigations were chiefly concerned with the preparation and testing of potency of phosphated crystal-violet vaccine. Altogether 11,702 pigs were treated. 82% of 328 pigs tested with virus a year after vaccination resisted with only a slight reaction, while a further 10% reacted severely and recovered ; 8% died. The treatment protects up to the marketing age, about eight months. Pigs kept for breeding must be revaccinated or be given serum-virus treatment. The vaccine retains its potency for four years. Aqueous extracts of trichinae caused a reaction when applied to the skin of sensitized animals and it is suggested that these may be useful as a diagnostic agent for TRICHINOSIS.

FIELD INSPECTION DIVISION [FLADNESS, S. O.]—This deals with the field operations for the eradication of SCABIES, other disease work in the field, inspection and quarantine of imported animals, control of imported animal products, hay, and straw, and the inspection and safe transport of animals for export.

INTERSTATE INSPECTION DIVISION [MILLER, A. W.]—The work is briefly described. Animals inspected were cattle 18,135,667, pigs 29,540,954, and sheep 21,832,485. 499 cattle and 356,212 sheep were dipped. Pigs immunized and disinfected against swine fever amounted to 184,042.

MEAT INSPECTION DIVISION [JOSS, E. C.]—Inspection of livestock and meat products was carried on at 681 establishments, in 253 urban areas. Details are given in ten tables of the *ante-* and *post-mortem* inspection of animals, causes of condemnations of carcasses and parts, and meat and meat products imported and exported.

PATHOLOGICAL DIVISION [SCHOENING, H. W.]—There were no positive results in 112 samples examined for GLANDERS. Only one of 492 samples of blood serum gave a positive reaction for DOURINE. Three million horses and mules, one-fifth of the equines in the U.S.A., were immunized with formalinized chick-embryo vaccine against EQUINE ENCEPHALOMYELITIS. Western type virus has been found as far east as Kentucky, and both Eastern and Western types were found in Alabama, the furthest spread westwards of Eastern virus. No essential modifications were found in Western type virus after 226 serial passages through chick embryos and in a series of transfers in embryos periodically interrupted by passages through the horse and g. pig. Attempts to demonstrate the virus in various internal parasites were negative. Methods of preserving the virus were investigated. Samples of g. pig and chick embryo dried over phosphorus pentoxide constantly maintained infectivity for a year. Severe local swellings, especially after a second vaccination, are reported with increasing frequency each year. Anaphylactic reactions sometimes occur and deaths have been reported. Intradermal vaccination is at least as good if not better than subcutaneous injection. EQUINE PERIODIC OPHTHALMIA was studied ; blood transfusions, injections of eye swabbings or strongyle extract, or histamine in lethal doses failed to produce the disease.

Work on SWINE ERYSIPELAS, ANAPLASMOSIS, and EQUINE INFECTIOUS ANAEMIA is briefly reviewed. Preliminary studies on LISTERELLOSIS in sheep are reported. TUBERCULOSIS in sheep was found to be due to the avian type in seven and to the bovine type in one case. Tissues of g. pigs, pigeons, and chickens experimentally infected with JOHNE'S DISEASE showed characteristic granulomatous changes resembling those of TUBERCULOSIS. *Salmonella cholerae-suis* and other paratyphoid organisms from swine were studied. Passage of SWINE INFLUENZA virus through mice was continued. The propagation and characteristics of the virus on chick embryos were also studied. Of 42 specimens examined for RABIES, two were positive.

Investigations on the toxic properties of *Psilostrophe sparsiflora* are reported. *Sophora alopecuroides* is very toxic to sheep. Research was carried out on hydrocyanic acid production by plants. The HCN content of silage from different varieties of sorghum showed an average loss of 29·7%.

At the branch laboratory at Auburn, Alabama, johnin given intravenously was found to be less reliable than when given intradermally. 33 of 35 reactors to the intradermal johnin test showed typical macroscopic lesions and organisms indistinguishable from *Mycobacterium johnei.*

DIVISION OF TICK ERADICATION AND SPECIAL DISEASES [MCKELLAR, W. M.]—Inspections and dipping of animals amounted to 16,214,872 cattle, 1,592,317 horses, and 1,278,921 sheep, goats, and deer. There are tables showing the progress made in tick eradication and also a summary of the work on SWINE FEVER control and in dealing with the 7,023 outbreaks reported.

TUBERCULOSIS ERADICATION DIVISION [WIGHT, A. E.]—At the end of the year there were 61,570,426 cattle under supervision for TB. eradication. 12,222,318 tuberculin tests were applied and 0·46% of cattle reacted, the lowest since 1917 when the project commenced. In the period 1917–40, 3,768,201 reactors were slaughtered. In the control of avian TB., 16,592,911 fowls were inspected and 7,141 farms were found to be infected.

JOHNE'S DISEASE was found as a result of tests with johnin or avian tuberculin, to exist to a slight extent in 12 states ; of the 383 cattle tested 8·6% reacted.

BOVINE CONTAGIOUS ABORTION agglutination tests showed 2·5% reactors in 6,937,428 specimens examined. Compensation is paid for the reactors slaughtered, as in the case of TB. Regulations provide that when a county shows less than 1% infected and the infected herds are not more than 5%, it may be declared a modified, accredited, contagious abortion free area for three years, provided that all infected herds are quarantined and pass additional tests. 9·7% of all counties in the U.S.A. containing 2,400,000 cattle are in this category and the scheme is being applied in a further 250 counties. A plan for accrediting individual herds as free from contagious abortion exists in 43 states ; this includes 1,174,191 cattle.

DIVISION OF VIRUS-SERUM CONTROL [SKIDMORE, D. I.]—Details are given of the control of all biological products, the supervision of 74 licensed establishments, 36 producing SWINE FEVER antiserum and virus, 32 preparing other products, and six making both classes of these products. Tables give details of production, rejections, imports, and exports of the various biological products.

REPORT OF ZOOLOGICAL DIVISION [SCHWARTZ, B.]—Cattle infected once with trichomonads may acquire a partial or solid immunity. Reinfection confers a solid immunity. Negative results were obtained in attempts to transmit ANAPLASMOSIS in bovines by *Stomoxys calcitrans*, the mosquito, *Psorophora columbiae*, and

adults of *Amblyomma maculatum*. Coccidia responsible for clinical symptoms in calves were *Eimeria nina-kohlyakimovi*, *E. faurei*, and *E. arloingi*. *E. parva* and *E. intricata* were occasionally found in small numbers. A fatal case of infection was caused in a two-month-old calf by inoculation with *E. smithi* and *E. auburnensis*.

LIVER FLUKE investigations near Angleton, Texas, showed intermediate hosts to be most abundant in temporary pools during drought seasons. Snails there survive long periods of desiccation and respond immediately to water. Few infected snails were found on pastures, indicating a definite seasonal cycle in fluke development in the intermediate hosts. Around Logan, Utah the snail, *Fossaria modicella*, is the most important intermediate host. The heat of summer affects the development of the miracidium in the fluke egg. The egg is also inhibited when it is in mud, but when freed it hatches normally. The average weekly gains of *Moniezia*-infested lambs and uninfested lambs were 1·24 and 2·43 lb. respectively. Investigations on nodular worm of sheep, *Oesophagostomum columbianum*, show that small doses of larvae cause no clinical symptoms, while a single massive dose or repeated moderate doses produce NODULAR WORM DISEASE. Eggs of the parasite appear 35–50 days after infection. Heavy infestations appear to stimulate an immunological response resulting in the trapping of many parasites in the nodules, thus preventing their return to the intestinal lumen to attain sexual maturity. In calves infected with nodular worms, anaemic symptoms may be observed about ten days before the appearance of eggs in the faeces. The erythrocyte count and volume are about 50% of those of normal calves. The symptoms of calves experimentally infected with lungworms (*Dictyocaulus viviparus*) are described.

Cattle treated for *Hypoderma bovis* and *H. lineatum* were found to need more than one treatment with washes made from 1 gal. warm water, 4 oz. soap flakes, and 12–16 oz. derris or cube powder. The larger quantity of derris was found more effective in killing grubs which came up after treatment was applied. DEMODECTIC MANGE was observed in cattle. Cattle lice were successfully killed by derris powder.

DIARRHOEA associated with *Iodamoeba* in seven sows is mentioned. *Sarcocystis miescheriana* occurred in 4% of garbage-fed pigs. In some cases the lesions resembled calcified tapeworm cysts. Examination of diaphragms of 6,313 grain-fed pigs showed that 0·47% had TRICHINA INFECTION while in garbage-fed pigs 8·9% of 829 diaphragms were infected. Intradermal injection of antigen composed of ground whole trichinae detected 75% of infected pigs. Reactions occurred in 15% of uninfected pigs. In winter the reactions were 36% in infected and 48% in uninfected pigs. Swine lungworm eggs retain their vitality when buried 4–8 in. below the soil for as long as 381 days. The mortality is less rapid under soil sown to grass. An average of four hookworms (*Crassisoma urosubulatum*) were found per animal in 8,550 pigs examined. Under conditions in southern U.S.A. they have little economic importance. Experiments showed that kidney worm larvae in mass (17,000) may cause death in infected pigs, whereas doses of 1,000 larvae have no effect. The biology of the swine thorn-headed worm, *Macracanthorhynchus hirudinaceus*, was studied.

The work on parasites of poultry is reviewed. Immunization against *Eimeria tenella* by feeding a small number of oocysts daily proved to be possible. The liver lesion caused by *Histomonas meleagridis*, which is ulcer-like with a pitted depressed centre, surrounded by an opaque, lighter coloured rim, could be differentiated from that of *Trichomonas gallinarum*, which has a cream-coloured centre from which rice-shaped bodies radiate outwards. *Hymenolepis carioca* was found to have little effect on well fed birds. There was a 35% reduction in nematode infection in a group of birds kept from contact with ground infected with poultry faeces. The cestode infection was not appreciably affected, as insect intermediate hosts transmit infection.

Phenothiazine was found to be 100% effective for the cure of STRONGYLOSIS in horses. It is also effective as a preventive if given at intervals. The drug sterilizes the strongyle eggs in faeces passed from the second day after treatment; the faeces become free of eggs in 6–7 days after treatment and, in individuals, have remained free for at least 35 days. Experiments showed that non-conditioned phenothiazine was as effective as the recrystallized product in removing parasites from 11 sheep. 25 g. doses removed 90·2% of *Bunostomum*, 84·3% of *Oesophagostomum*, 95·9% of *Haemonchus*, 48·1% of *Ostertagia*, 76·8% of *Trichostrongylus*, 14·9% of *Cooperia*, and none of *Nematodirus*. Phenothiazine was also successful in removing stomach worms, hookworms, and nodular worms from goats and calves as well as nodular worms from pigs.

Of 116 preparations tested to remove *Raillietina cesticillus* from poultry, lead arsenate in gum, and stannous oleate with pelletierine hydrochloride were satisfactory. Preliminary experiments suggest that cheap amines, such as diphenylamine, may be substituted for synthetic pelletierine hydrochloride in the tin compound mixtures.—J. A. GRIFFITHS.

Extracts from Annual Reports of Agricultural Experiment Stations, U.S.A. [The matter given here is a bare outline of the work done. When papers by the staffs of these stations are published, abstracts are prepared from them and included in the *Veterinary Bulletin* as a matter of routine. Details of the titles of these reports and of relevant papers contained in them will be found in the *Index Veterinarius*.]

ARIZONA, 1939–40.—Short notes are given on (1) negative bacteriological research into INFECTIOUS KERATITIS in range cattle, (2) calf losses and their prevention by more skilful management, (3) control of ox-warble flies by derris, and (4) the breeding of strains of fowls resistant to FOWL PARALYSIS.

CALIFORNIA, 1938–40.—Experience gained in research on, and control of, MASTITIS is described. The last three counties in California and in the whole of the U.S.A. to be declared "free" from bovine TUBERCULOSIS are referred to. Calfhood vaccination against bovine BRUCELLOSIS was started in two counties. A "blood test" for CASEOUS LYMPHADENITIS was developed. Deer were found to be concerned in the spread of ANAPLASMOSIS in cattle: a method of immunization of cattle has been introduced. Great hopes are founded on a new "B.T.V." (eucalyptol tissue vaccine) vaccine for SWINE FEVER. A severe outbreak of VESICULAR EXANTHEMA in swine is described. Parasites (blowflies and helminths in sheep and ectoparasites in poultry), their occurrence, and their control are referred to. The causes of ACETONAEMIA in cows and LAMBING PARALYSIS are discussed. A study of the vitamin A requirements of horses was concluded. Research on poultry diseases included work on INFECTIOUS CATARRHAL ENTERITIS, vaccination against FOWL POX, FOWL PARALYSIS, and NUTRITIONAL DISEASES.

DELAWARE, 1939–40.—A study of the local Tabanidae was made.

IDAHO, 1940.—MASTITIS was studied in the station herd; micrococci as well as streptococci were involved. Acriflavine udder infusions were judged to be of poor therapeutic value, but diathermy and sulphanilamide

are well spoken of. The agglutination test is regarded as valuable in the diagnosis of subacute and chronic SWINE ERYSIPELAS. PARATYPHOID in chinchillas was diagnosed. Phosphorus deficiency in yearling steers resulting from a diet of alfalfa hay, beet molasses, and wet beet pulp *ad lib.* is described. Data are given for the phosphorus requirements of ewes and lambs. Research on BACILLARY WHITE DIARRHOEA was directed to tests of commercial and experimental antigens for the whole blood tests, and to studying the effect of vitamin C on the production of antibodies against *Salmonella pullorum*. Results of a three-year study on the carotene requirements of laying hens are given: a daily intake of 0·2 mg. appears to be adequate. For growing chicks 100 μg. carotene per 100 g. of feed mixture was adequate. Good quality alfalfa is a good source of carotene. Orchard grass, relatively rich in manganese, was found to be a good perosis preventive.

INDIANA, 1939–40.—Evidence on the value of vaccination with strain 19 against bovine BRUCELLOSIS was demonstrated by experiment involving artificial infection. Brucellosis was eliminated in a herd of cows by serological testing and removal of reactors. The feeding to lambs of fluorine in the form of rock phosphate resulted only in some anorexia at a level of 6 mg. F per sheep per day. Many other incomplete investigations are mentioned.

IOWA, 1939–40.—Work on three inbred lines of White Leghorn fowls showed that resistance to FOWL TYPHOID could be fixed as an inherited quality. Similar work on mice and MOUSE TYPHOID was continued: immunity appeared to depend on mutation of the infecting organisms. Several distinct lines of research on FOWL PARALYSIS and LEUCOSIS are briefly described, particularly transmissibility and acquired immunity. The technique of hypophysectomy in fowls was studied. Lack of vitamin E appeared to have no adverse effects on the FERTILITY of goats, as it has on rats.

KANSAS, 1938–40.—Attempts to isolate a causal virus in MASTITIS failed; sulphanilamide therapy failed in one animal. The Hotis test was considered very effective. Lacto-vaccine is declared useless. Tests of a live vaccine [no details] against BRUCELLOSIS gave good results, but were not complete. No effective method of chemotherapy has been discovered for ANAPLASMOSIS. Attempts to cultivate *A. marginale in vitro* failed. It was found that the virus of EQUINE ENCEPHALOMYELITIS is transmitted between larval and nymph stages in *Dermacentor variabilis* as well as in *Rhipicephalus sanguineus*. Several study projects were carried out on PULLORUM DISEASE, TRICHOMONIASIS in turkeys, FOWL PARALYSIS, *Raillietina* infestation, and immunity against *Ascaridia*. Miscellaneous diseases of horses and cattle are also referred to.

KENTUCKY, 1940.—The following new types of *Salmonella* were isolated and identified for the first time:–*S. oregon*, VI, VIII : d : 1,2,3, *S. urbana*, XXX : b . . . — enx (both from swine and also from fowls), *S. lexington*, III, X : z_{10} : 1, 5 . . . (from swine), and *S. manhattan* VI, VIII : d :— 1, 5 . . . (from fowls). Three other previously identified types were isolated from fowls for the first time, *viz*, *S. thompson*, *S. aberdeen*, and *S. hvittingfoss*. Some research data on VIRUS ABORTION in mares is given; the presence of epithelial inclusion bodies is said to be diagnostic. The results of hundreds of examinations of horses for PERIODIC OPHTHALMIA are summarized. No evidence of its connexion with BRUCELLOSIS could be obtained. BLACKHEAD was found in a peafowl as well as in turkeys. *Salmonella typhi-murium* was recovered from four horses dying a few days after being dosed against STRONGYLOSIS with an oil of chenopodium mixture. Phenothiazine was found effective but injurious to health. Sodium fluoride powder, and nicotine sulphate (in paint form for application to the perches or dusted on the bird) were equally effective against chicken lice. ACETONAEMIA was diagnosed in four bovines, 11 sheep, one goat, and three pigs.

MICHIGAN, 1938–40.—Serum magnesium in calves was found to fall markedly during the change from winter to summer. Data on Mg requirements with various diets are given. Most of the work described was published separately [refs. given in text] and covered the following subjects:—mastitis, brucellosis, calf pneumonia, necrotic enteritis in swine, *Pseudomonas* infection in turkeys, causes of death in sheep, and magnesium deficiency in calves.

MONTANA, 1938–40.—Notes are given on BLACK DISEASE of sheep, MASTITIS in sheep, and bovine BRUCELLOSIS.

NEW JERSEY, 1939–40.—*Brucella abortus* was isolated from the udders of ten vaccinated heifers which had apparently contracted natural infection. Causes of widespread disease in N.J. herds are discussed. 25,000 cattle are imported annually. The role of imported uninfected animals in causing a "flare-up" in BRUCELLOSIS is mentioned. PARATYPHOID in pigeons caused loss; the blood agglutination test proved to be rather unreliable. The advantages of egg-cultivated virus for the production of vaccines against avian virus diseases are stated. The value of special breeding to reduce the incidence of FOWL PARALYSIS has been demonstrated.

NEW MEXICO, 1939–40.—A research project in rather cryptic terms on BLINDNESS and OEDEMA in dairy animals is outlined.

SOUTH CAROLINA, 1939–40.—In a cow infected artificially in two quarters with a haemolytic streptococcus, there was a sharp decrease in total milk yield with a sharp rise in carotene content. Sulphanilamide therapy effected a cure. A method of tattooing the udders of cows is described. Two methods of management designed to reduce the worm burden (kidney worms and roundworms) in swine are described; results were of limited value. Phenothiazine was found to be effective in the removal of stomach, nodular, and hook worms from sheep.

SOUTH DAKOTA, 1939–40.—Tests on rabbits of a pasteurella bacterin showed that 50% of them could be immunized. Chopped chenopodium plants used to replace part of the alfalfa ration had some anthelmintic effect on sheep. A study of the gases and gas pressure in the rumen of cows with BLOAT was made; methane and CO_2 were present in quantity and CO and H_2S in traces. Arsenic in water or food was found valuable in rendering harmless otherwise toxic amounts of selenium. A high protein diet had the same effect, whilst bromobenzene removed Se from the body *via* the urine. Se in excess of 5 p.p.m. in grain was found to be injurious to fowls. A study of the toxic agent in oat hay was begun.

TEXAS, 1940.—Transmission tests with nine species of Texas ticks as possible vectors of bovine ANAPLASMOSIS gave negative results. *Tabanus atratus* appeared to act as a mechanical vector. A helminth parasite survey of Texan cattle was made; a list of worms so far identified is given. SORE-MOUTH vaccine was issued on a large scale. Vaccination of 2,700 ewes with a zinc chloride toxoid of *Clostridium welchii* Type D resulted in a loss of 0·4% of lambs from ENTEROTOXAEMIA, compared with a loss of 2·7% among controls. An unsuccessful attempt to discover the cause of sporadic BOVINE ENCEPHALOMYELITIS was made. The continued feeding of sulphur to calves and goats had no effect on parasitism

by lice. Toxicity tests of many plants were made. The great efficiency of phenothiazine as an anthelmintic against *Haemonchus* was demonstrated in many experiments. Several dietary deficiency studies are described.

WASHINGTON, 1939–40.—An electrical conductivity test for MASTITIS gave results about as reliable as the chloride test. Phenothiazine was found to be effective against *Heterakis gallinae*. PEROSIS was produced experimentally in turkeys. Work was done on the toxic principle of *Amsinckia intermedia*. Lead arsenate poisoning occurred in sheep grazing in orchards of sprayed fruit trees.

WESTERN WASHINGTON, 1939–40.—Fowls kept in pens with straw litter which was cleaned out once a month had a high mortality rate from COCCIDIOSIS, but those in pens cleaned out weekly did not. Whey mash had some slight lowering effect on mortality. Cocks which were reactors to the blood test did not transmit *S. pullorum* to hens. Evidence of the egg passage of FOWL LEUCOSIS was obtained. Breeding experiments illustrated the existence of susceptible and of resistant family lines to leucosis. The effects of various food supplements on CANNIBALISM in poultry are recorded.

WISCONSIN, 1939–40. Part I.—CHASTEK PARALYSIS of foxes was shown to be due to feeding on some kinds of raw fish : it was prevented by boiling the fish. The disease is not a simple avitaminosis B_1 as has been stated. Vitamin C was found to cure INFERTILITY in cattle by parenteral injection. Deficiency in vitamin A apparently lowered the vitamin C content of the blood, and ascorbic acid cleared up eye symptoms of A deficiency in calves. Several other nutritional studies are also reported. " SWEET CLOVER DISEASE " was proved to be due to a derivative of coumarin.

Part II.—Nicotinic acid was found to be useful in some cases of NECROTIC ENTERITIS in pigs, but many other factors are also concerned. Advice is given on mineral supplements for swine. The belief that frosted sorghum and Sudan grass are poisonous was disproved ; young, new shoots growing up among frosted grass are, however, high in HCN content. A synthetic phenoxy-chloro-ethyl ether was found to be useful as a fly repellent. Some poultry nutritional studies are described.—J. E.

U.S.A. (1941). **Report of the Veterinary Division, U.S. Army, 1940.**—*Rep. Surg. Gen. U.S. Army, 1940.* pp. 209–256.

The authorized strength of the Veterinary Corps on 30 June, 1940, was 126 officers and 639 enlisted men. Two officers were on duty throughout the year in the Surgeon General's Office, and veterinary officers on duty at the Army Medical Centre served as instructors in bacteriology and allied subjects for both the Veterinary and Medical Schools of the army. The Army Veterinary School has been producing equine encephalomyelitis vaccine since January 1939. Vaccine sufficient for 38,128 horses and mules was supplied and no case of the disease occurred amongst the animals inoculated. It is pointed out that there were cases in 42 out of the 48 states amongst civilian animals. Research work has been carried on in connexion with the preservation by freezing of cultures of *Trypanosoma equiperdum* and also in connexion with the production of an immunizing agent against the virus of equine influenza.

The Veterinary Corps is responsible for the inspection of meat, meat food, and dairy products, including the sanitary condition of establishments or plants in which the product is produced, prepared, manufactured, stored, or handled, except those under the sanitary supervision of the Bureau of Animal Industry.

The average strength (horse and mules) of the army in 1939 was 23,432. The admissions per 1,000 strength were 949, and the deaths 72 per 1,000 strength.

—H. V. HUGHES.

U.S.A. (1940). **Report of the Secretary of Agriculture, 1940.** pp. 184. Washington, D.C. : U.S. Govt. Printing Office. [8vo] [15 cents].

This review, issued annually, gives a general account of agricultural conditions in the U.S.A. The reports of the several sections of the Department of Agriculture, *e.g.* that of the Bureau of Animal Industry, are of course published separately. Brief mention is made on pages 155–158 of a few diseases, *viz*, BOVINE TUBERCULOSIS, BOVINE BRUCELLOSIS, TICK INFESTATION, TRICHINOSIS, and diseases which it is important to exclude from the U.S.A.—J. E.

U.S.A. VIRGIN ISLANDS. (1940). **[Report of Veterinarian] Agricultural Experiment Station, St. Croix, Virgin Islands [1939-40].** [KENDALL, G. C.] pp. 5. [Typescript].

U.S.A. VIRGIN ISLANDS. (1941). **[Report of Veterinarian] Agricultural Experiment Station, St. Croix, Virgin Islands (1940-41].** [KENDALL, G. C.] pp. 5. [Mimeographed].

These reports deal with the inspection of animals exported and imported, with diagnostic tests, vaccinations and therapeutic treatment of animals.

During the year 1939–40 there were eight positive reactors among about 1,800 cattle tested for BRUCELLOSIS. All of 2,700 cattle tuberculin tested were negative, and one horse and 69 mules were all negative for GLANDERS. Seven pigs were vaccinated against SWINE FEVER and HAEMORRHAGIC SEPTICAEMIA and eight dogs against RABIES.

During 1940–41 there were 13 reactors among 750 cattle tested for BRUCELLOSIS ; TUBERCULOSIS and GLANDERS were absent. A few pigs and dogs were vaccinated as in the previous year.—J. E.

3244—Wt.P516—Dd.176—750—6/42—H. R. G. Ltd.—G. 13.

Printed under the authority of His Majesty's Stationery Office by H. R. GRUBB, LTD., Croydon

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No. 2.—Issued June.	Indexing period previous July—December.

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